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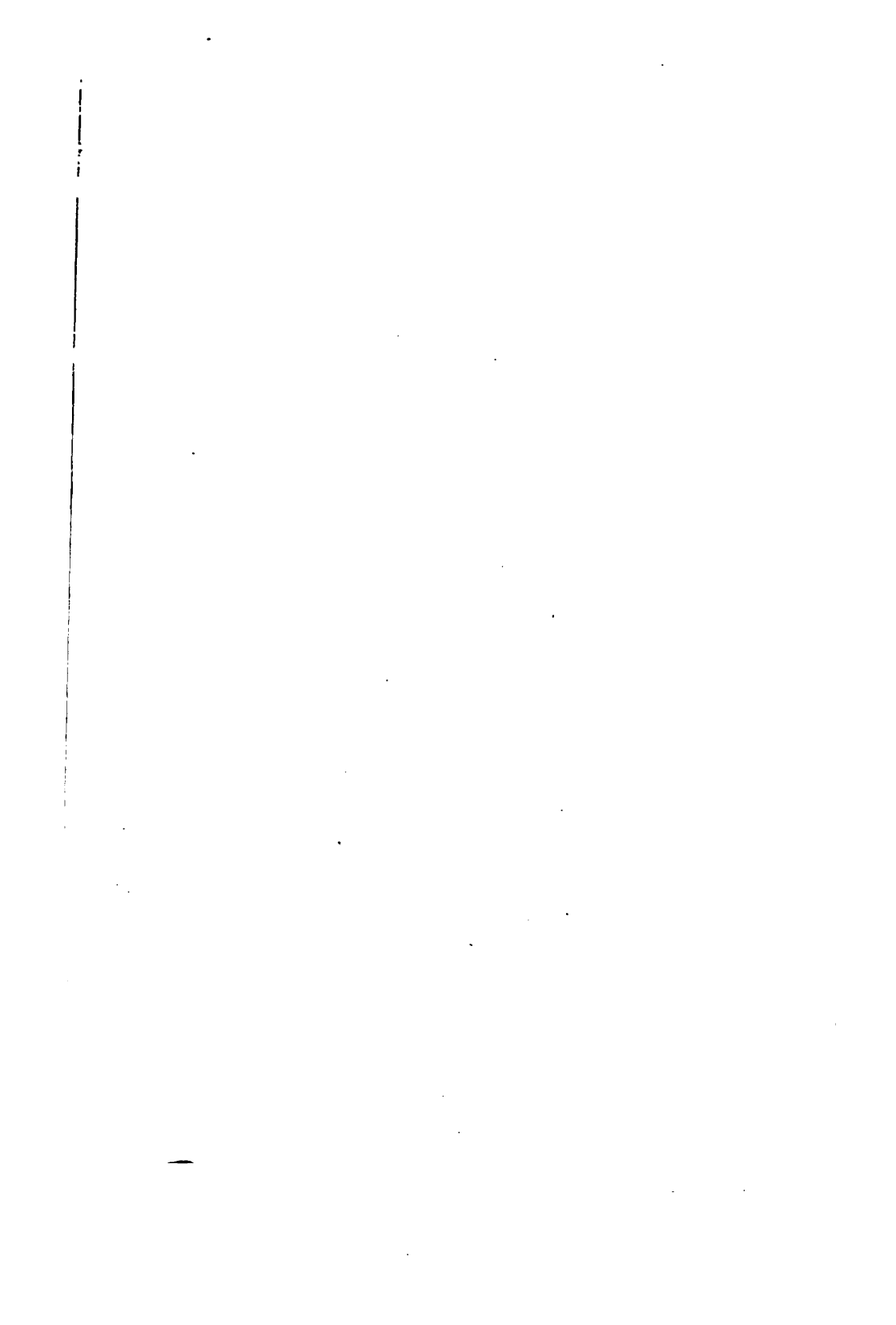
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STREETS AND TRAFFIC OF LONDON.



ADDRESS
ON THE
STREETS & TRAFFIC OF LONDON,

*Delivered at the Opening Meeting of the Session (1898-9) of the
SOCIETY OF ARTS, ON WEDNESDAY, NOVEMBER 16, 1898.*

By SIR JOHN WOLFE BARRY, K.C.B., LL.D., F.R.S.
(CHAIRMAN OF COUNCIL.)

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By SIR JOHN WOLFE BARRY, K.C.B., LL.D., F.R.S.

(CHAIRMAN OF COUNCIL.)

In selecting a subject for my address, I have thought that there is one which touches all our interests, and with which I happen to have been brought in connection for many years. It will oblige me to allude to some of the many aspects of modern London, as the particular question which I propose to consider is that of the means of communication of its inhabitants with each other by means of our streets and thoroughfares. I take this to be one of the pressing matters of the present time, not only in respect of the existing state of things, but still more in view of the future requirements of our ever growing population.

If I can succeed in bringing before you sufficient information and such a view of the questions involved as to induce some systematic consideration of this great subject, I shall feel that my labour has not been thrown away. I am sure that nowhere will the subject find more adequate recognition than in this theatre, in which so many problems for the amelioration of our physical conditions have been discussed and forwarded.

Before we approach the detailed consideration of the topic we must realise its extent and boundaries, and the first question which arises is—What is to be understood as London? and in particular what is the London which we have in our mind when we speak of its streets?

If we take London as defined by the jurisdiction of the Metropolitan and City Police, we have an area of 688 square miles, and a population of nearly 6,000,000. If we deal with Postal

London we have an area of 243 square miles, and a population of perhaps from five to five-and-a-quarter millions. And if we reckon as London, the County of London and City of London controlled for municipal purposes by the London County Council and the Corporation, we are dealing with an area of 115 square miles, and a population of upwards of 4,500,000.

For the purposes of this address there should be added to the County of London the southern portion of West Ham, which district is not included in it for administrative matters, and we thus arrive at an area nearly oval in shape, having a major axis, east and west, of 12 miles, and a minor axis, north and south, of 11 miles. This area contains about 122 square miles, and a population of nearly 5,000,000. It is the region as last defined which we may denominate as "London and its Environs," as distinguished from "Greater London," under which term I include the much larger area within the police boundaries.

We must, of course, recognise that "London and its Environs," with its 5,000,000 of inhabitants, may be roughly divided into urban and suburban portions, and without attempting a precise division I think that we may take it that the parts continuously built upon and covered with streets and houses as distinguished from roads and lanes, villas and cottages, have an area of about 95 square miles and a population of perhaps 4,000,000. This area we may distinguish as "Urban London."

The last-mentioned estimate can only be a rough approximation, for everywhere in suburban London things are in a state of transition, and roads and villas are continually giving place to continuous streets and houses.

We talk glibly of millions, but it is difficult for the human mind to realise what a million means. Perhaps the following illustration may help us. A person counting aloud can in a minute count from 140 to 180, depending on his power of enunciation. If we adopt an average of 150 per minute, and assume that he will not repeat the complicated numbers, but will count up to 100 and then a second 100 and so on, 6,666 minutes or approximately 9 days of 12 hours each, will be required in which to count one million. Thus, if a man could perform such a feat of endurance, and could count continuously as rapidly as 150 per minute, he would be occupied from 6 a.m. to 6 p.m. every day, from the 1st of December to the 24th of January, in counting the present population of Greater London.

So far as the effects of population are concerned, it is necessary to take careful note of the 6,000,000 inhabitants of Greater London as well as of those of the immediate suburbs, because the question of intercommunication in Urban London is intimately bound up with matters which are brought into prominence by the existence and growth of the population of the whole area. It may confidently be said that the inhabitants of the whole of the 688 square miles, and those from a still larger area, are more or less constantly passing in and out of the strictly urban portions, thronging the streets with pedestrian and wheeled traffic of all descriptions. An active circulation is kept up, as in the human body, from all parts to and from the central heart of the system. We must keep this fact prominently before us in our consideration of the streets and thoroughfares of Urban London.

Some years ago (in 1891) the daily influx and efflux of traffic to and from the City only, was enumerated and found to amount to a total of 1,186,000 individuals. There is a similar though smaller ebb and flow of traffic at other business centres, such as Westminster, the Strand, Oxford-street, the Temple, and its neighbourhood; but, as far as I know, no systematic counting has ever been made except in the City itself.

Again, in the middle of the day there are the numberless ladies and others who come for their shopping or visits to the western and central parts of the town, and we have also in the afternoons and evenings the theatre-going and amusement-seeking public. Both these classes come from the suburbs and return there in great and increasing numbers.

In this connection we may note the great augmentation in the number of theatres and other places of amusement within the last thirty or forty years. These, though chiefly situated in the more central parts of London, undoubtedly rely greatly, if not mainly, on the patronage of those who live in the suburbs or are staying in town as visitors from remoter parts. The same may be said of the large retail shops, warehouses, and stores. Both have increased greatly in neighbourhoods in which the resident population is either stationary in numbers or diminishing, indicating clearly enough that the choice of position is independent of the number of neighbouring inhabitants.

To a large extent this great circulation of traffic in and out of central London is the creation of the last thirty or forty years, and it has added enormously to the demands on our

street accommodation, as compared with the requirements of the volume of traffic which existed when the streets were mainly used by people dwelling within perhaps one or two miles of Charing-cross.

Forty years will take us back to a date anterior to the opening of the Metropolitan and District Railways; and it will be interesting to note in a general way what has been done by railway companies to endeavour to keep pace with the growth of suburban traffic within, for example, 20 miles of London. Afterwards we may profitably consider what has been undertaken during the same period by municipal bodies towards improving the streets.

Forty years ago none of our main lines had more than two tracks of rails into London—now all have at least four; and it is common knowledge that the necessity for widening our railways into London was mainly occasioned by the rapid and continuous growth of suburban traffic. The Charing-cross line, with Cannon-street Station, was but thought of. Victoria, Broad-street, Liverpool-street, Fenchurch-street stations, all of which are chiefly occupied by suburban traffic, either did not exist or had been too recently opened to have produced their full effect.

The Joint Committee of Parliament which in 1864 considered various railway schemes which were then being promoted in order to grapple with the ebb and flow of traffic and its distribution, had the crowded state of the streets very much in view, and the hope was general that a circular railway touching the chief terminal stations of the main lines combined with a line under the Thames through the old Thames Tunnel, and with another line from north to south through the centre of London, would effectually relieve the traffic of the streets.

The recommendations of the Joint Committee resulted in the construction of the Inner Circle line, with extensions east and west and junctions with most of the main lines; of the East London Railway (utilising the Thames Tunnel) for access to South London; and in the St. John's-wood line, giving access to the northern suburbs. The northern and southern districts have been connected by the West London Railway and by the junction at Ludgate-hill between the Chatham and Dover and Metropolitan Railways, giving direct access to the Great Northern and Midland Railways; and in addition, the Great Western,

the Great Northern, the North-Western and Great Eastern systems have been brought into the heart of the City at Broad-street and Liverpool-street. Another useful line recommended, but not yet made, would have joined the South-Eastern and North-Western Companies' systems by a route from Charing-cross-bridge to Camden-town.

We have lately seen the construction of the City and South London and of the Waterloo and City Low-level Electric Railways, and the important Central London Railway (also low-level) from Shepherd's-bush to the City is rapidly approaching completion.

I roughly estimate that in the widenings of the railways above mentioned and in construction of the various metropolitan and suburban lines since 1858 there has been an expenditure of not less than £60,000,000 sterling, of which the larger portion has been incurred during the past 20 years.

The result, so far as the public streets are concerned, has certainly not answered the expectations which were formed by Parliament. Not only have the Metropolitan and District Railways, as well as the other railways alluded to, developed an enormous additional suburban traffic of their own, which has been thrown into inner London, but the facilities afforded by them have also largely increased the amount of travelling from one part to another of the central parts of London itself, adding greatly to the movement of those inhabiting the town itself.

I have tried to estimate the daily number of persons entering and leaving Urban London daily by railway only, from and to the suburbs, and I arrive at the large number of 960,000. This amount of traffic, which is to a great extent new since 1858, is all thrown on the streets either in the form of pedestrian or omnibus or cab traffic, between the railway stations and the destinations of the travellers.

After the railways, consider the increase of the omnibus traffic. In 1871 there were 1,268 of these vehicles, and now there are 3,170, and 1,000 tramcars. Thus the number of these vehicles, taken together, has more than trebled in 27 years.

If a man stands in Cheapside, he will in an hour count 384 omnibuses as passing him; if in the Strand, 444; if in Piccadilly, 423; if at the junction of Oxford-street and Tottenham-court-road, 487, or an average of from 6 to 8 omnibuses in every minute. In certain streets the number of omnibuses

permitted to run is strictly limited by the police, irrespective of the demand for the accommodation which larger numbers could afford.

As to cabs, in 1871 there were 7,341, and now there are no fewer than 11,034, and this great increase has occurred in spite of the establishment of late years of railway omnibuses.

Another means of transit remains to be alluded to, namely, the river steamboats. This subject introduces some interesting considerations. When I was a boy the steamboat service was better and much more used than at present. There were two independent lines of steamers, one of which ran only between Westminster and the City, while the other started from Chelsea or higher up the river and ended the journey at London-bridge; some were express steamers stopping once on the journey, and others called at every pier. A steamer was available every five minutes from one end or the other of Westminster-bridge, and they travelled at a good speed. In addition, the means of access by steamboat were very good from Putney on the west, and from Woolwich on the east, to London-bridge.

These facilities have largely disappeared, and though many efforts have been made to improve the service and attract traffic, they have not been very successful. I think the reason is to be found in those facts of suburban dispersion to which I have alluded, added to the comparatively low rate of average speed on a river with a strong tide, as compared with the speed even of metropolitan railways; to some extent in the character of accommodation on the London steamers, and still more in the inconvenient situations of the City piers.

Though steamboat travelling might easily be made more attractive, I question whether there is scope for much further development in it, and certainly not to the extent of its becoming of great value in grappling with the increasing demand for circulation in Urban London. Nevertheless, there are very considerable numbers of persons still conveyed by the river steamers. The Thames Steamboat Company have 35 steamers running during the summer, but none during the winter months.

As to carts and waggons, the numbers are continually growing. In 1858 there were but few railway vans, as the bulk of railway carting was done by contract — now there are 6,000 vans belonging to railway companies, but a comparison in this respect of the two periods is not feasible. We

know, however, that the numbers have been much augmented, while the increase in the number of other carts, postal vehicles, and waggons can only be marked as most considerable without the possibility of actual enumeration. The traffic of carts and waggons bringing produce into London, especially from the market gardens, and returning empty or with manure, is almost continuous. In fact, during the 24 hours, as London grows in numbers, there is more and more pressure on the central districts in which are situated the markets and places of distribution for the whole of the urban and most of the suburban retail trade.

Lastly, we have the bicycles, at present in their stage of infancy or early growth, the numbers of which are only kept down in the metropolis by the dangers which their riders encounter in our streets. This mode of travelling, which will grow in importance and that very rapidly throughout the whole civilised world, is one upon which I shall have more to say later on. It is a form of vehicular traffic which should not be undervalued or lost sight of, but which is, practically speaking, impossible at present in Urban London.

In the endeavour to give some idea of the traffic in four of our principal streets, I have quite lately had observations taken, and find that the total numbers of vehicles and foot-passengers passing a selected spot in a busy hour, even in the winter months, are as follows:—

	Vehicles.	Pedestrians.
Cheapside.....	992	6,358
The Strand.....	1,228	5,660
Piccadilly.....	1,497	3,910
Tottenham-court-road	661	5,586

The great traffic which I have endeavoured to describe is most wonderfully controlled by the police, but no one who has lived in London can doubt that the pressure on the streets is getting yearly heavier and heavier, and becoming more and more unmanageable. I think, that it must continue to increase for reasons apart from the mere increase of population, and to these I will presently allude.

The increase of population is, of course, a most important

consideration, of which I do not wish to lose sight, and the following figures indicate some remarkable results:—

In 1851 the population of what is now the County of London was 2,330,000, and it is now 4,500,000, but in the contemplation of this increase as a whole, it is a noteworthy fact that in many of the central districts of London, not only has there been no increase of resident population, but, on the contrary, that a serious diminution has taken place.

For example, as between 1851 and 1896, we note the following decreases:—

In the City.....	from	127,000	to	31,000
„ Holborn	„	47,000	„	31,000
„ Marylebone.....	„	158,000	„	141,000
„ St. Giles.....	„	54,000	„	38,000
„ St. James	„	36,000	„	23,000
„ St. Martin.....	„	25,000	„	13,000
„ Strand	„	44,000	„	24,000
„ Westminster.....	„	65,000	„	53,000

In these districts alone there has been a decrease of 202,000, or 36 per cent.

Others of the central districts are nearly stationary in numbers, and it may be safely said, that the great growth in the numbers of residents is almost entirely in what were the immediate suburbs of the Urban London of 1851.

Contrasted with these figures the increase of population between 1851 and 1896, in the undermentioned districts, not to mention others, has been as follows:—

Battersea	from	11,000	to	165,000
Camberwell.....	„	55,000	„	253,000
Fulham.....	„	12,000	„	114,000
Greenwich.....	„	67,000	„	176,000
Hackney	„	54,000	„	213,000
Hammersmith.....	„	18,000	„	104,000
Hampstead.....	„	12,000	„	75,000
Islington.....	„	95,000	„	337,000
Kensington.....	„	44,000	„	170,000
Lambeth.....	„	139,000	„	295,000
Lewisham	„	16,000	„	104,000
West Ham.....	„	19,000	„	270,000

Thus we find an increase in these particular districts of 1,734,000, or over 300 per cent,

If we extend our view to the suburbs of Greater London, such as Bromley, Enfield, Harrow, Willesden, Ealing, Staines, Richmond, Twickenham, Kingston, and Croydon, it appears that the increase between 1851 and 1896 is no less than 3,200,000, or 125 per cent.

The ratio in the decennial growth of population in London, with all its suburbs, shows some slight sign of diminution by the last census, but it is still sufficiently startling to find that during the past decade the average increase is nearly 100,000 per annum, and that a population equal to that of a town like Huddersfield is added yearly to the numbers of the metropolis.

The late Royal Commission on the Water Supply of London tells us what we are to expect in the future. After careful study of the question they came to the conclusion that in 1931 Greater London would contain a population of from 8½ to 12 millions, the precise numbers depending on how far the present or former ratios of annual increase will in the future be sustained.

Now I take it that the rapid increase in the population of the suburbs, as compared with the strictly urban parts of the metropolis, is due to three prominent causes.

First, the increased wealth of the middle and labouring classes, combined with the desire of all for more accommodation in their houses and their surroundings.

Second, the modern development of cheap locomotion.

Third, the extreme value of the sites in Central London.

(1.) With regard to the first of these causes, we find that the rateable value of the County of London (excluding the City) per inhabitant, was £5 9s. 2d. in 1891, and is now £7 2s. 4d. Apart from this test, we know that wages and salaries have increased in a larger proportion. The augmentation of wages of artisans and labourers cannot be less than 35 per cent. in the last 30 years, while, with the exception of house-rent, most of the necessities and luxuries of life are conspicuously cheaper. Thus there is a much larger margin for that travelling which not only enables many to live at a considerable distance from their work, but permits them to move in and out of London in connection with entertainments and pleasures of various kinds.

(2.) I have already indicated what railway companies have done in providing physical means of access to the suburbs, by widenings of their lines and by extensions of their systems.

These improvements have resulted in cheap fares, season tickets, and workmen's tickets at prices unknown in former times. Thus a third-class season ticket for a year will enable a man to perform 600 journeys for a distance of, say, 12 miles for 3·8d. per journey; while workmen's tickets permit their holders to travel to and from, say, Enfield, a distance of 22 miles at 2d. per journey. Omnibus fares have been reduced since 1851, by about 50 per cent., and the introduction of the penny fare has immensely increased the short distance journeys. Again, as tramways have been introduced within the same period, the fares paid, in proportion to distance, have been still further diminished within the period under review.

If, as has been the case in Glasgow, half-penny fares by tramcars and omnibuses are introduced, we shall doubtless see an enormous increase in the number of these vehicles and a greater crowding of our streets than can be easily realised.

Apart from suburban developments, it is to be observed with regard to the whole railway system of the country, that the great concession to third-class travellers inaugurated by the Midland Railway, under the enlightened advice of the late Sir James Allport, in consequence of which third-class carriages are attached to all trains, has caused an immense and even startling development of travelling throughout the whole country, and naturally the metropolis has experienced a large amount of that increase, attracting as it does visitors to itself in far larger numbers than formerly was possible, from all parts of the kingdom far outside the limits of Greater London.

(3.) The other cause of suburban development which I mentioned, viz., the rise of value of land in central situations since 1851, is most remarkable. It is one of the great difficulties which the London County Council have encountered in dealing with the important matter of housing the working-classes expropriated by improvements of thoroughfares.

The Chairman of the County Council recently stated that, in the case of the proposed street from Holborn to the Strand, the value of sites, in the immediate neighbourhood of the improvement, was so high that the use of the land for housing the working-classes, who would be dispossessed, would mean a loss to the Council of £260 per person apart from the cost of the buildings to be constructed for the purpose, whereas on a site only 1½ miles distant the expenditure for land would be but £9 per head and further afield it would be still more reduced.

These facts, which are more or less applicable to other schemes for accommodating the working-classes in central positions, are potent reasons, apart from all other considerations, why easy, speedy, and cheap locomotion are vital questions for the welfare of London, and, on the other hand, why the volume of traffic in our streets indicates continuous increase, keeping pace with and in many places overtaking the means of accommodating it.

These appear to me to be some salient points of the case, which have produced the congestion of our streets, and must infallibly tend to rapidly add to that congestion.

I have endeavoured to describe in my preceding remarks, however briefly, some of the means to meet the case which have been attempted by railway, omnibus, tramway and steamboat companies, and by commercial enterprise in general, as distinguished from Government and municipal efforts; and I have purposely left aside such questions as the acquisition of tramway lines by the County Council, which only very indirectly touch the subject, being a mere change of ownership and management, possibly, though not certainly, resulting in cheaper fares.

I propose now to consider the new streets and widenings of streets which have been carried out in the last 45 years with the view of dealing with the constantly growing streams of traffic. In comparison with the large expenditure by railway and tramway companies, we cannot but be struck with the smallness of the mileage of streets made and of the capital expended.

The following are the most prominent of the street improvements executed within the last 40 years, exclusive of the Thames-embankments :—

Date.	Length. Furlongs.	Cost. £
1854. Cannon-street	3½	500,000
1864. Southwark-street	5	366,000
1870. Holborn-viaduct and streets connected with it.....	6	2,552,000
1871. Hamilton-place	1	111,000
1871. Queen Victoria-street.....	5	1,076,000
1876. Northumberland-avenue.....	1½	711,000
1882. Tooley-street.....	6	405,000
1883. Hyde-park-corner	1	11,000
1884. Eastcheap.....	1½	600,000
1886. Shaftesbury-avenue.....	5	779,000
1887. Charing-cross-road	4	584,000
Totals	4 m. 7½ f.	£7,696,000

The total expenditure, small as it is for the metropolis during so many years, is really an over-statement, as it takes no account of the recoupment by sale of surplus property, improved rents, or the like. On the other hand, there are no doubt many street improvements of less prominence which I have not mentioned. But in the aggregate, and when all are recognised, the mileage and expenditure in so long a period cannot but appear very small, and especially when contrasted with what has been laid out for the purpose of pouring traffic into London.

In the matter of street improvements in London also, one cannot but notice an almost entire absence of grasp of a large subject. We can, no doubt, record some useful and even fine undertakings, but in the history of the past half century, we look in vain for any new arterial thoroughfares traversing Inner London from end to end, and proportioned in width to the demands upon them at different parts of their route. On the contrary, we find in the new streets, as in the old ones, that the nearer they are to the heaviest of the traffic, the narrower they are in absolute dimensions.

Cheapside, Fleet-street, Piccadilly, the Strand, Oxford-street, Marylebone and Euston-roads remain very much as they were 50 years ago, when the traffic was a mere fraction of what it is now, for there has been, practically speaking, no attempt at improvement in these most important thoroughfares. In the case of the Strand, no doubt some relief has been found from the Thames-embankment, promoted, though it was only in a minor degree, as a thoroughfare, but the monstrous condition of the Strand at crowded hours of the day and night shows that the embankment roadway, which has been opened 28 years, has failed to afford the necessary relief. At such times, one can say, in the words of Hood, that there is

“No road, no street, no t’other side the way.”

I desire to speak with all respect of those who years ago conceived the idea of Regent-street. I believe we have to thank the Prince Regent and Nash the architect for having made this highly important arterial line of communication from north to south in a comprehensive manner way and with some conception not only of the requirements of that time, but also of those of the then future. At the same time we can appreciate in Regent-street a distinct recognition of the value of architectural treatment and grouping.

If when Regent-street was designed in 1813, the four east and west routes by Pall-mall, Piccadilly, Oxford-street, and the New road were adequate for the east and west traffic, we can realize that Nash's wide Waterloo-place and Regent-street with its circuses at Piccadilly and Oxford-street, and joining Portland-place the only 100 feet street in Mid-London (except Whitehall which is 125 feet wide), was a work conceived in a large-minded way, and was a real effort to deal with the requirements of the north and south traffic at the western end of London.

When, however, we come to consider more modern street improvements, most of them, at least, seem piecemeal and patch-work enterprises, narrowed to the very least dimensions which would pass muster, and without any but the most meagre provision for the future, or the slightest attempt at systematic artistic treatment. In fact, we cannot but note a hitherto incurable *petitesse* in dealing with such matters in London, contrasting remarkably with what we see in foreign cities of far less importance and wealth than the English metropolis.

For example, when Queen Victoria-street—a highly useful and costly undertaking—was made, not only was the inadequate width of 65 feet adopted for a street having shops and warehouses on both sides, and in prolongation of the Victoria-embankment, which is 110 feet with no buildings upon it at which vehicles stop to load and unload, but where Queen Victoria-street crosses Cannon-street, an existing street (New Earl-street), which had a width of only 50 feet, was allowed to remain and form part of the new thoroughfare.

Again, where the new street was to reach the Mansion House no provision was made by any widening of existing thoroughfares to carry the traffic forward, and as Queen Victoria-street in the nature of things was only a means to an end, viz., to enable traffic to reach the heart of the City, the congestion at the Mansion House was unrelieved by it, and we not only see this highly expensive street blocked by traffic at Cannon-street, but also find the confusion at the Mansion House worse confounded.

In the instance too, of the important widenings of Eastcheap and Tower-street, made—only some 15 years ago—at the joint expense of the Metropolitan Board of Works, the City, and the Metropolitan and District Railway Companies, a width of only 60

feet was adopted, though I remember the late Colonel Haywood, the experienced engineer of the Commissioners of Sewers, stating that even 80 feet would soon be found inadequate. His prophecy has been already fulfilled. The widening of Ludgate-hill, but very recently completed, leaves this most important approach only 59 feet wide, crowded with shops on both sides, and such through lines of communication as Fleet-street and Leadenhall-street remain untouched with widths of 45 and 33 feet respectively.

Even the highly useful and well-designed Holborn-viaduct improvement was a local and not an arterial improvement, for it left Newgate-street and Cheapside unaltered, and was the means of forwarding the traffic to other points of congestion. Apart from this consideration, the viaduct, and the streets leading to it, form collectively a very fine and creditable work, and they have been an immense benefit to Londoners. The value of the undertaking can only be appreciated by those who remember the steep slopes of Holborn-hill and the continual congestion of traffic, in consequence of the level crossing of Holborn and Farringdon-street.

In recent improvements outside the City the width of 60 feet has been adopted for Shaftesbury-avenue, and the Charing-cross-road, and one can easily see even now that in a few years both will be found much too narrow, though the north and south traffic does not perhaps call for such widths as does that from west to east.

Even in the case of Northumberland-avenue one cannot but notice the same fatal parsimony. If ever there was a case for a fine street, as approaching the Thames-embankment, this surely was one, and at the time at which it was formed, urgent representation were made in favour of a width of at least 100 feet. But they were in vain; some not very important banking house would have been destroyed, and to avoid this the line of the avenue was altered, and a width of 80 feet adopted for the main approach to the Thames-embankment which is 110 feet wide.

Now of course it must be admitted that a street 80 feet or 100 feet wide will cost more than one 60 feet wide, but it will not cost proportionally more. This is specially the case when a street is widened and not cut transversely to existing streets, for in the former case the chief elements of expense lie in the compensation for frontagers trades.

If one assumes a street of 60 feet in width from house to house, about 12 feet on each side must be devoted to footways, leaving 36 feet for vehicular traffic. About $8\frac{1}{2}$ feet on each side must be deducted for drays and carts standing at the houses, and all that remains is 19 feet, which is only adequate for two or at most three lines of moving vehicles.

But when one criticises these dimensions, what is to be said of the Strand (50 feet wide, constricted at one of the busiest parts to 40 feet) or of Piccadilly between Sackville-street to Regent-street (55 feet wide), or of Cheapside (50 feet wide), except that they are ludicrously inadequate to the demands of a great city flooded daily with an enormous influx from a closely populated area of 688 square miles.

What do we find in continental cities? In Paris, the old Boulevards have a width of 114 feet, the Rue de Rivoli (commenced 60 years ago) of 88 feet, the new Boulevards, a width of 80 to 130 feet. In Vienna and Berlin, the Ringstrasse and the Unter den Linden have widths of 187 feet and 196 feet respectively, and the lower Kärntner Strasse and the Prater Strasse, also in Vienna, of 121 and 118 feet, in Buda-Pesth the Andrássy Strasse must be 140 feet wide, and in New York the principal Avenues have widths of 80 to 150 feet, and those in Washington of 160 feet.

If we take Paris alone by way of contrast with our metropolis, we find that in about 40 years the following important street improvements have been effected, besides many others:—

	Length. (miles.)	Width. (feet.)
Completion of the Rue de Rivoli.....	1·4	88
Boulevard Sebastopol.....	2·5	95
„ Strasbourg	2·5	95
„ Haussman	1·7	95
„ Malesherbes	1·7	125
„ du Palais	0·2	130
„ St. Michel	1·1	80
„ St. Germain	2·0	125
„ Magenta	1·2	90
„ Voltaire	2·0	95
Avenue de l'Opera	0·5	98
Rue de quatre Septembre	0·6	80
Avenues leading to the Champs Elysées	3·5	100

Total.. 18·4 miles.

As in my reference to the principal street improvements of

London, so in the case of Paris, there must be a large number of less prominent works the aggregate of which must be very considerable, and more in proportion to those above mentioned than the London improvements not included in my former list.

It is to be carefully borne in mind that the want of accommodation for the traffic in the streets of London is not merely a question of the grumbling of those who suffer from it, but involves many other considerations. In the first place there is daily and hourly loss of much money in the delays to men in business or professions, and to the operative classes. We must add loss of time to vehicles and horses, and further we suffer from the practical impossibility of introducing cheaper and more expeditious means of modern transit, such as by electric tramways, and also from the want of free circulation of air.

I may here refer to the extremely valuable and interesting report on City improvements, written by the late Colonel Haywood to the City Commissioners of Sewers so long ago as 1867, in which he points out the immense loss of money daily occasioned by inadequate streets, and recommends various modes of relieving the recognised congestion of the City. Some of these recommendations, such as the Holborn-viaduct and the Tower-bridge, have been carried out; but we look in vain for the great arterial street, recommended in the same report, extending from Newgate, on the west, to the Commercial-road, on the east.

As to one aspect of the financial returns of improved streets I find in Colonel Haywood's report that about 1847, it was stated before a Parliamentary Committee that the annual loss incurred in carriage traffic alone on Holborn and Ludgate hills, amounted to £100,000. And again, on the same subject, he remarks:—

“Thus, inadequate thoroughfares are not only inconvenient but are expensive to the public; lead to police regulations which impede the free and natural course of the traffic and business of a community; and are repugnant to the spirit of the age. Evidence may, at the present time, be adduced in support of these views, by reference to the Traffic Bill now [1867] before the Houses of Parliament. By it the hours during which coals can be delivered are to be much restricted, and it is computed by one who has unusual opportunities of forming a sound opinion on the subject, that it will result in the price of coals being increased to the consumer as much as 2s. 6d. per ton, involving a total loss to the metropolitan inhabitants of between £400,000 and £500,000 annually.”

I mention such figures not as any attempt to estimate even

in part the financial effect, but as illustrations of one aspect of the great influence of adequate or inadequate thoroughfares on the trade generally of a great city.

In further comparison of wide and narrow streets, we can recognise that, apart from the circulation of air, the ground on each side cannot be so well utilised by lofty buildings in the narrower thoroughfare. It is rightly a regulation in London that at most an angle of 45° at the pavement should be subtended by the opposite side of a new street. Thus a street 100 feet wide will permit of 40 feet more in height on each side being devoted to additional stories as compared with a street 60 feet wide. Consequently, three stories on each side are sacrificed by adopting the narrower street. In these days of rapidly moving lifts, which give value to the upper stories, such a consideration ought to be a great help towards the extra cost of the land required for the wider street.

Again, one broad continuous thoroughfare is, so far as the circulation of air is concerned, a vastly different thing from the same width cut up into two narrow streets, and would tend to improved health and sanitation.

Apart from time saved and the benefits to health the question of accidents to life and limb, which might be avoided by less crowding of vehicular traffic, should not be lost sight of. At present no fewer than 150 persons yearly, or an average of nearly one person every second day, lose their lives by street accidents in London, and the number of the injured amounts to 8,000 per annum.

My plea then is that what is wanted to meet the requirements of the traffic of London is not so much additional railways, underground, or overground, traversing the town and connected with the suburbs, but rather wide arterial improvements of the streets themselves. Railways, though carrying immense numbers of passengers, and however useful they may be, have not and cannot produce the desired result of relieving the streets; on the contrary they tend to add to the congestion from the point of view of urban movement and have enormously augmented the suburban influx.

The Metropolitan and the District Railways carry between them about 140,000,000 of passengers annually, but the bulk of this great traffic is not urban, but is of suburban origin, deposited in urban localities, and it is an open secret that if

these two chief underground railways had to rely only on strictly urban passengers, they would be nearly bankrupt. The reason for this is not far to seek. The urban journey is generally a short one, and when the little losses of time necessary to reach a station, catch a train, and go from the station to one's destination are all reckoned, the omnibus which carries a man direct from one door to the other, at fares which are frequently cheaper than even a third-class ticket, is found the preferable mode of transport. Moreover we must take note of the fact that the third-class traffic is in numbers 78 per cent. of the whole traffic on the underground lines, for this indicates that the mass of the travelling public scrutinises expenditure narrowly, and implies that so long as omnibuses can carry people for penny fares, and still more if the half-penny fares of Glasgow are introduced in the metropolis, the vehicular traffic of the streets will show more and more increase as compared with the journeys made from one part of the town to another by railway. Apart, however, from all these considerations, the extension of the underground railways into the suburbs more than counterbalances what relief they afford to the traffic of the streets by carrying strictly urban passengers.

I do not lose sight of the fact that the new Central London Railway, now nearly approaching completion, is being made under the important thoroughfares of Oxford-street, Holborn, and Cheapside, but for reasons already given, I do not think that any underground line can do very much to relieve the evergrowing traffic of the streets. No doubt the new railway will carry multitudes of passengers but it will create a new urban and suburban traffic of its own, and the experience of the Metropolitan and District lines is that surface transit for short distances continues to increase, in spite of the competition of the underground railways, even if it be not fostered by them.

I had written the above remarks as to the influence of railways before I read Col. Haywood's Report of 1867. I am pleased to see that his views entirely coincide with mine in this as indeed in other particulars.

In my judgment, the question of street improvements in London should be considered as a whole and in a large-minded way, unless we are to be doomed to perpetual disappointment. We should endeavour to enlarge our views of present requirements, and provide for our successors. A scheme of new main

thoroughfares of adequate width for present and future traffic should be laid down, and be realised as time and finance will permit. It should be a scheme worthy of London, and such as that which was published in 1666 by Sir Christopher Wren for the renovation of the City after the fire of London, but unhappily laid aside; or as was designed for the improvement of Westminster, and presented to the public by my father, Sir Charles Barry, in 1857, and published in the memoir of his life.

There should be continuity of effort towards radical amelioration, by the construction of main lines of through communication as distinguished from merely local improvements; and all such local improvements should be so devised as to form parts of a harmonious whole. Thus I venture to think that the first thing to be done by our municipal rulers, is to realise what is wanted, and to employ the highest and most experienced talent of the day to design the best lines for arterial thoroughfares.

Much has to be done without delay, but it is not necessary to urge that the whole expenditure should be immediately or concurrently undertaken. The vital point is to endeavour to realise requirements and to make every improvement which can be put in hand subserve the purposes of a thorough conception of the problem of how best to deal with the traffic of London in the great streams from east to west and from north to south.

Apart from wide streets, a matter which has been too much lost sight of, is the provision of means for allowing the north and south traffic to cross the east and west traffic with the least possible confusion. With the exceptions of the north approach of London-bridge crossing Thames-street, of the famous Highgate Archway, of the Holborn-viaduct improvement undertaken by the Corporation of London, and of the arches which carry the south approaches of Waterloo, Blackfriars, and Southwark bridges over the roads immediately adjoining the river bank, there are no means of such crossings in London otherwise than on the level.

A very easy and obvious improvement could be readily effected by passing the north approach to Southwark-bridge by means of a short viaduct over the crowded thoroughfare of Upper Thames-street. This would not only get rid of a somewhat troublesome level-crossing but add greatly to the utility of Southwark-bridge by reducing the gradient of the north approach.

If some means could be devised for crossing the north

and south traffic over or under the east and west traffic at such places as Hyde-park-corner, Piccadilly-circus, Ludgate-hill, the south end of Tottenham-court-road, and Wellington-street (Strand), by a viaduct or by a sunken road as in each case might be the more suitable, the relief to the main thoroughfares at the spots in question would be enormous.

A scheme is now being promoted for a new street from the Strand to Holborn, in a line, or nearly so, with Waterloo-bridge; but its utility, great as it may be in itself, will be greatly marred if no means are provided for dealing with the traffic from the south of the Thames by Waterloo-bridge, and crossing the Strand, or with that coming from the north, and crossing Holborn, otherwise than throwing it athwart the east and west traffic in those crowded thoroughfares.

Of course, all such works would be costly, for they involve not merely the actual crossing of leading thoroughfares by means of bridges and viaducts having approaches of 1 in 30 or 1 in 40, but the connection of the streets on the level must, of course, be also maintained, so that any traffic desiring to change its direction might be able to do so. The results would, however, be well worth the expenditure, heavy as it might be, and I venture to contend that as in the case of the provision of wide arterial streets, the abolishing of right-angled level crossings by means of sunken or raised roads and bridges ought not to be put aside as impracticable because it involves the difficulty of cost. Such crossings would be as efficacious in their way of systematically meeting the wants of London as the other more obvious work of widened thoroughfares, while they possess the advantage, that they could be put in hand at once without waiting for the completion of the great through routes. There is no reason whatever why such works should be unsightly; on the contrary, they might be made highly artistic, and be architectural embellishments of London. When we contemplate what has been voluntarily spent by railway companies in getting rid of level crossings and junctions on their main lines of traffic, or remember the expenditure which is properly laid upon them by Parliament when they carry their lines across public streets, the outlay necessary for providing over or under crossings for the enormous vehicular and pedestrian traffic of London ought not to be considered too heavy or as being ill spent.

The mode of executing such works would require much study,

and different crossings would have to be dealt with in different ways. I have given some consideration to the subject at the points above mentioned, and I can say that there is nothing impracticable in the suggestion, and I feel confident that such improvements would be really worth their cost.

Approaching now the question of improved arterial streets, I cannot but feel that to lay down any unexceptionable plan for dealing with the main lines of traffic of London must involve much study. I should be rash to do more than roughly indicate what I think should be aimed at.

There are three main lines of east and west traffic north of the Thames, viz. (1) Euston-road, (2) Oxford-street, and (3) Piccadilly taken together with the Strand, all of which urgently call for remedial measures of a drastic character, but before discussing the north side of the river I should like to say a few words on the thoroughfares of the south side of the Thames. They certainly merit full attention, though, as a matter of fact, I think that the general urgency there, apart from one or two special points, is not so great as on the north side.

Dealing then, first, with Lambeth, Southwark, and Bermondsey, we notice that, owing to the great bend of the Thames between Vauxhall and Bermondsey, the direction of the main lines of traffic on the south side of the river is radial, with a southerly trend, as distinguished from the chief lines of traffic on the north side of the river, the main direction of which is east and west.

Owing also to the fact that the bridges of London have, with the exception of London-bridge, been all built within the last 150 years, the roads leading to them from the south are wider, and more adequate to modern requirements than the older streets of the north side. Again, in consequence of the radial roads being numerous, there is no such pressure of traffic along them as we see on the north side of the river, except where three of the bridge roads bring their traffic more or less to one point near the "Elephant and Castle" tavern, from which it again disperses.

At this spot the congestion is frequently serious, and it will certainly become worse, and no doubt some improvement is required which should have for its object the separation of the at present converging streams of traffic before they reach the present point of concentration.

Although, as I have said, the chief lines of traffic are radial, it is right to remember that there is a very considerable stream of traffic to be accommodated on the south side of the Thames, which passes generally east and west, though following the bending course of the river. To deal with this traffic brought into London by the Wandsworth and other roads we have, starting from the west, the Albert-embankment, 85 feet wide, made by the Metropolitan Board of Works at a cost of £1,014,000, the old streets of the York-road and Stamford-street, 60 feet wide ; and Southwark-street, a comparatively new work, 70 feet wide, made in 1864 by the Metropolitan Board of Works at a cost of £366,000, ending in the overcharged thoroughfare of the Borough.

When all these streets are considered as one thoroughfare, we see again the inevitable blots of piecemeal undertakings. The widths are designed in a haphazard way, so that where the route ought to be wide, as at the access to Waterloo Station, it is narrow, the eastern end of Southwark-street is connected with Tooley - street (by which traffic is continued further eastward) only by narrow and tortuous lanes, or by the alternative route of a nearly double right-angled corner, involving very steep gradients to and from the south end of London-bridge and to Duke-street. Added to these disadvantages, the east and west stream of traffic has to cross on the level all the routes north and south from Vauxhall, Westminster, Waterloo, Blackfriars, Southwark, and London-bridges.

Anyone who knows the Westminster-bridge-road and York-road and Waterloo-bridge-road, on a busy day at Waterloo Station, when the traffic is blocked as far back as Parliament-street, or is acquainted with the continual and vexatious stoppages which occur at the crossings of Waterloo - bridge - road and Blackfriars-road and at the Borough, will recognise, first, that the east and west routes on the south side of the Thames have been laid out from time to time as merely local improvements, and without any grasp of the necessity for a main trade route approximately parallel to the river bank, and, secondly, that before long these imperfect means to an end must be extended, straightened, and widened on a more adequate basis.

Leaving the southern side, I will now refer to what I recognise as of more importance and urgency, viz., the north bank of the Thames and the three main lines of east and west traffic. These

are, as I have said, the Euston-road (in which term I include Praed-street, and Chapel-street at the west, and the Pentonville and City roads at the east); Oxford-street (in which term I include Bayswater-road, Holborn, Newgate-street, and Cheap-side); and Piccadilly, with Knightsbridge, the Kensington and Hammersmith roads, the Strand, Fleet-street, Ludgate-hill, and Cannon-street. I venture to submit that the two more important of these are almost ludicrously inadequate to what is wanted.

The Euston-road route is less glaring in its shortcomings than that of Oxford-street, and the Oxford-street route is better than that of Piccadilly and the Strand. It appears to me that in respect of all three routes there can only be a choice between greatly widening the routes themselves or making parallel streets. I am purposely omitting here any allusion to the crossings of the north and south streams of traffic, which subject I have already discussed at some length.

In the case of the Euston-road, the widenings and improvements which would be necessary are shorter and would involve less serious consequences than in the other thoroughfares, and I submit that if a bold widening of Praed-street and Chapel-street were undertaken together with a connection of Junction-road by a wide street direct with the Bayswater-road, near Victoria-gate, some considerable widening of Euston-road from Chapel-street to eastward of Baker-street (so as to include the two important railway stations of the Great Central and Metropolitan companies); if another bold widening were made from Albany-street to Gower-street, together with an avoiding parallel street from Chalton-street to Rodney-street (so as to leave the existing road as an access to the Midland and Great Northern Stations); and if at the east end of the line a more convenient connection were made with Old-street, this northern line of communication east and west through London might serve for some years to come.

When we turn to the Oxford-street route, we are face to face with a more important line of traffic and one more crowded than the Euston-road route. Coming from the west, we may, I think, say that with the exception of some narrow places near Notting-hill-gate Station, and of the confused crossing at the Marble-arch, the Oxford-street route is fairly adequate as far east as that point, having regard merely to the present traffic on the portion in question. But eastward of the Marble-arch a radical im-

provement is wanted, either by means of important widenings or by a new street, which should be carried through the City so as to connect at its eastern end with the Mile-end-road, and thus to form a wide thoroughfare extending from the west to the east of London. Such a street, so far as the City itself was concerned, was proposed by Colonel Haywood in 1867, who stated that he limited his design to the City because of his appointment being confined to the limits of its jurisdiction.

As to the width of such a thoroughfare I would point out that we have, I think rightly, in view of the narrowness of our streets, stopped the southern tramways at the south side of the Thames bridges, and the northern tramways at corresponding distances from the centres of traffic; but it cannot be doubted that this necessity is most unfortunate for the poorer classes of the metropolis. It certainly appears to me that electric tramways on or close to the surface of the ground are what will be wanted in the near future of London, on at least one great through route east and west, and on two, or perhaps three routes north and south.

It is also obvious that any such accommodation, however desirable, cannot be afforded by any street of the width of the present Oxford-street and Holborn. Thus the only hope for such tramway accommodation lies in wider thoroughfares than any which we now possess.

Another want which is also beginning to be pressing, is a route for bicycle traffic. One cannot but recognise that the bicycle, as a means of rapid and cheap locomotion, is a new endowment to mankind, and even now we can see what an advantage it would be to the bulk of Londoners if they could travel safely and at perhaps eight or ten miles an hour, on their bicycles from their homes to their work and back again.

We meet already, in country districts, with artisans going to their work and returning homewards on their bicycles, covering by this means distances which were but a few years ago prohibitory. We ought not to be content that Londoners, and especially our working-classes, should be debarred from these facilities by reason of the dangers of our over-crowded streets.

A few years ago I said in an address to the Institution of Civil Engineers that I looked forward to the time when bicycles would be almost as much part of a man's—and, doubtless, also of a woman's—equipment as a pair of boots, and from the progress

which has already come about, I think that this was scarcely an exaggerated anticipation.

The present high prices of bicycles will not, I suppose, rule very long, and we shall see these admirable machines made at prices which seem now unattainably cheap. The proper application of machinery in the making of bicycles will result in the same reduction as it has occasioned in the manufacture of watches. The weight of a bicycle is so small that the value of the materials (except that of the india-rubber tyres) cannot be serious. And if a good machine-made watch can be manufactured and put together and sold for less than £1, the mere manufacture and putting together of a bicycle ought not, with adequate machinery, to cost very much more. If we add the cost of the steel and of the india-rubber, it surely seems not too sanguine an estimate to suppose that a few years hence bicycles will be sold at about a third or fourth of their present price.

When this takes place, are Londoners to be debarred from the use of bicycles by the fact that the streets are so crowded with vehicular traffic as to be too dangerous for them. This will seem hereafter to be as absurd as a proposition that foot passengers ought not now to be accommodated in the streets because of the requirements of the omnibuses and cabs.

If these views of the future requirements of London are correct, we want, in my opinion, one new and spacious thoroughfare east and west, about 120 feet wide, that is to say, as wide as Whitehall, opposite the Horse Guards.

Whether it would be cheaper to cut such a new street through the property north or south of Oxford-street and Holborn, or to widen those thoroughfares, would require much more study than could be given to the subject in such an address as this.

My impression is that in the case of the central line of traffic, east and west, money would best be laid out in a grand new street, similar to one of the great Boulevards of Paris, rather than in any widening of such trading thoroughfares as Oxford-street and Holborn, Newgate-street or Cheapside, for in making an entirely new street the property to be acquired would have less present trading value, and there would be much less disturbance of commerce than in widening the existing streets, while at the same time the frontages to the new thoroughfare would be new assets of immense value hereafter.

The street then which I have in view might follow approxi-

mately the route indicated on the map at the end of this address, leaving the Bayswater-road near Westbourne-terrace, following the line of Wigmore-street to Russell-square, passing northward of the British Museum, thence to near Broad-street Station, and ending at the Commercial and White-chapel-roads, as proposed by Colonel Haywood. In addition to this east and west artery, there should be two or three thoroughfares north and south, slightly less in width, which should be carried over or under the main east and west routes, by bridges at the points of intersection, and all these new routes should have a raised or sunken road throughout for bicycles and electric cars, so that these should not mix with either ordinary vehicular or pedestrian traffic. Communication between the streets and the sunken roads could be given by ramps at selected spots for bicycle access, and by steps, and stables for the bicycles could be provided at the level of the sunken road by excavations and enlargements similar to those of the admirable underground lavatories of modern construction, which are so great a boon to Londoners.

I have shown by the sketch in the corner of the map how the subsoil of such a new street as I have indicated could be utilised so as to accommodate (a) a central bicycle road 30 feet wide, lighted at distances of about 150 or 200 feet by well-holes at the street refuges; (b) two tracks for electric tramways, to which access could be given from the street refuges; (c) subways of ample size for gas and water pipes, hydraulic mains, electric cables, and similar necessities which nowadays continually occasion the vexatious breaking up of our streets and (d) the necessary cellarage for the houses. As in the case of the streets shown on the map, so also with regard to the modes of utilising the subsoil I merely throw out these suggestions for consideration, my desire being not to put forward a definite map of new streets, nor a detailed design of their construction, but rather to endeavour in this way to stimulate a broad view of what is wanted for London, leaving it to others, better qualified than myself, to bring forward acceptable plans and proposals to be systematically worked to, as time and opportunity and financial considerations permit.

When one contemplates the cost of such a work as an arterial street 120 feet wide through the length and breadth of London, the prospect is, no doubt, somewhat alarming. A street of this

kind four or five miles long, with side streets and the works of construction, must mean an expenditure of many millions of money, though the recoupment from the ground-rents of such a new street would be very important if no undue haste in their realisation were made. This, however, is the kind of undertaking required for the London of the future, and if foreign capitals can undertake the great streets to which I have referred, why should we take such niggardly views of what is really important for the public good of our metropolis?

We have discussed two out of the three east and west thoroughfares, and we come naturally now to that of the Strand, Fleet-street, and Piccadilly. In this case it seems to me that systematic widening of all these three thoroughfares is probably the only course to be adopted, together with the construction of a broad diagonal street from Piccadilly-circus, viâ Coventry-street, to join the widened Strand near the south end of Wellington-street, so as to avoid the right-angled bend of Waterloo-place with its steep gradient. In addition some equivalent for the diagonal street from the Strand, near Waterloo-bridge, to the Thames-embankment, proposed in 1868 by the Metropolitan Board of Works, and laid aside from exaggerated reverence to the somewhat obscure Chapel of the Savoy, should certainly be made. It would be of the greatest use in relieving the western parts of the Strand. The new street, so long talked of, to connect the Mall with Charing-cross, and afford a direct route from Charing-cross to Buckingham-palace-road, and to Hyde-park-corner, viâ Constitution-hill, is another pressing necessity, and could very easily be put in hand.

Constitution-hill urgently calls for widening, and this could readily be done by the inclusion of the present riding path on its east side. The bridle path could be moved a few yards into the Green-park, where it would be a very attractive feature—a sort of miniature Rotten-row. The present roadway is much too narrow for the traffic in the London season, and the bridle path is so narrow as to be dangerous, not only to equestrians, but also to the vehicular traffic. This improvement could be carried out without disturbing any of the trees, and the widened Constitution-hill would form a stately approach to Buckingham Palace from Hyde-park.

I fear that in suggesting the various improvements which I have sketched, I shall be accused of extravagant and utopian ideas, but

when one contemplates the vast sums spent by railway and public companies to bring traffic to London, or remembers what has been done by continental nations to improve their means of transit in their capitals and to embellish them, and how little we have done for our city, and further, if one realises, however imperfectly, the enormous waste of money involved by inadequate streets, I cannot see that Londoners should consider the cost of such measures in the metropolis of the kingdom—may I not say of the Greater Britain—as prohibitory. I have above given an indication that a wise and liberal expenditure on street improvements brings with it an immediate return in money as it certainly does in public convenience, though the financial recoupment does not appear in the same direct way as do fares paid to public companies for the use of their means of locomotion.

One difference attending continental improvements, as compared with those of this country, is that they are largely paid for by indirect taxation or by octroi duties, while our only system, since the short-sighted repeal of the coal and wine duties, is that of direct rating. The money must equally come out of the pockets of the inhabitants, but our present system certainly tends to cramp the views of our administrators. Unquestionably it is right that those who pay should have a directly preponderating voice in the expenditure. This they have here, and no doubt the electors narrowly scrutinise the rates, but I should not despair of educating the public of London to an appreciation of the value of good arterial means of communication so that those of their representatives who favour them would not run the risk, which one and all of them so much dread, of being accused of extravagance when the day of re-election comes. Expenditure may be wise or foolish, and it is foolish expenditure on ill-considered schemes and piecemeal projects which should be deprecated, as really extravagant.

All roads were said to lead to Rome. How much more do they now lead to London from every part of the civilised world. London is *par excellence* the city of Europe, Asia, Africa, and America. England is the home of our fellow subjects from every colony, and I think I may say also of many of our American cousins. London is the richest city ever known and the most populous, but when this is acknowledged we have to admit that its streets are getting day by day, in spite of the improved means of transit afforded by underground railways, more and more

impassable, and to look more and more mean, while we cannot shut our eyes to the certainty that in 33 years we shall be face to face with a population which may be 50 per cent. larger than at present.

Is it not time then to approach the subject of our streets in a systematic way, laying down the principles to be carried out and working steadily towards a great result?

The expenditure involved, heavy as it no doubt must be, would be repaid by the increased facilities both for trade and pleasure. London would be more convenient and more attractive for all than it now can be. The stress of life would be lightened, and the saving of time to the millions using our streets would be enormous, though, as I have said, a money value to that saving cannot be definitely appraised. Economy of time is in some of its aspects of more importance to the poor even than to the rich, for to the poor man who has nothing to sell but his labour, time is of cardinal importance. The crowding together of our labouring classes would be diminished as better facilities of easy and cheap locomotion enabled them to reside in the outer ring of London, increasing their means of inhabiting healthy homes and adding greatly to the happiness of themselves and their families.

My ideas of what is wanted may be erroneous or imperfect—and I do not pretend to their being more than suggestive—but be that as it may, I cannot but think that the relief of the present congestion of our streets by a systematic and well-considered enlargement of the arteries of London, is a subject which must commend itself as of primary importance to the whole city—nay more, to the whole nation. It is a matter worthy of the fullest consideration by those who would devote themselves to no inadequate treatment, but to such a large-minded plan of a remodelled town as was made by the great architect of the 17th century in respect of the City of London after the great fire; and such as has been carried out so successfully in Paris, where I suppose the cost of land and of construction differs but little from similar values in London.

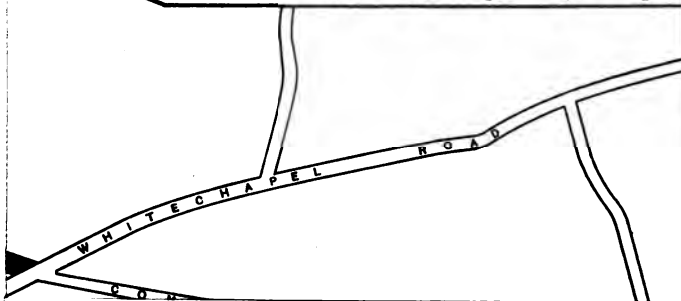
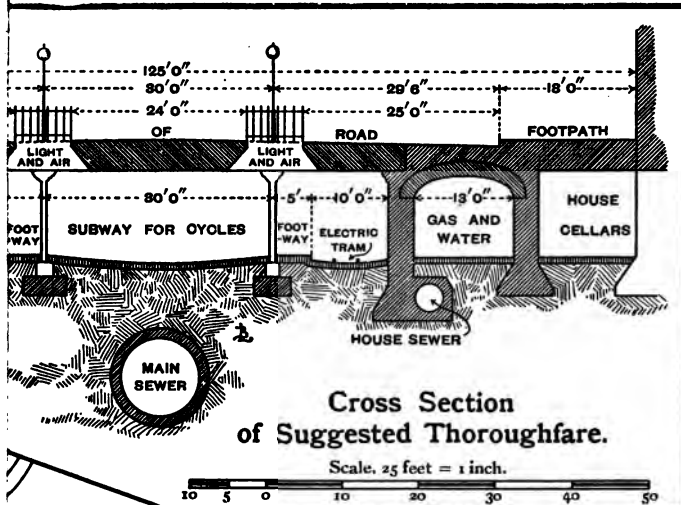
In conclusion, I have to acknowledge the valuable assistance which has been rendered me in various quarters. The Foreign Office very kindly caused enquiries to be made in several foreign cities, and have supplied me with much interesting information. Similar statistics have also been kindly provided by the Mayors

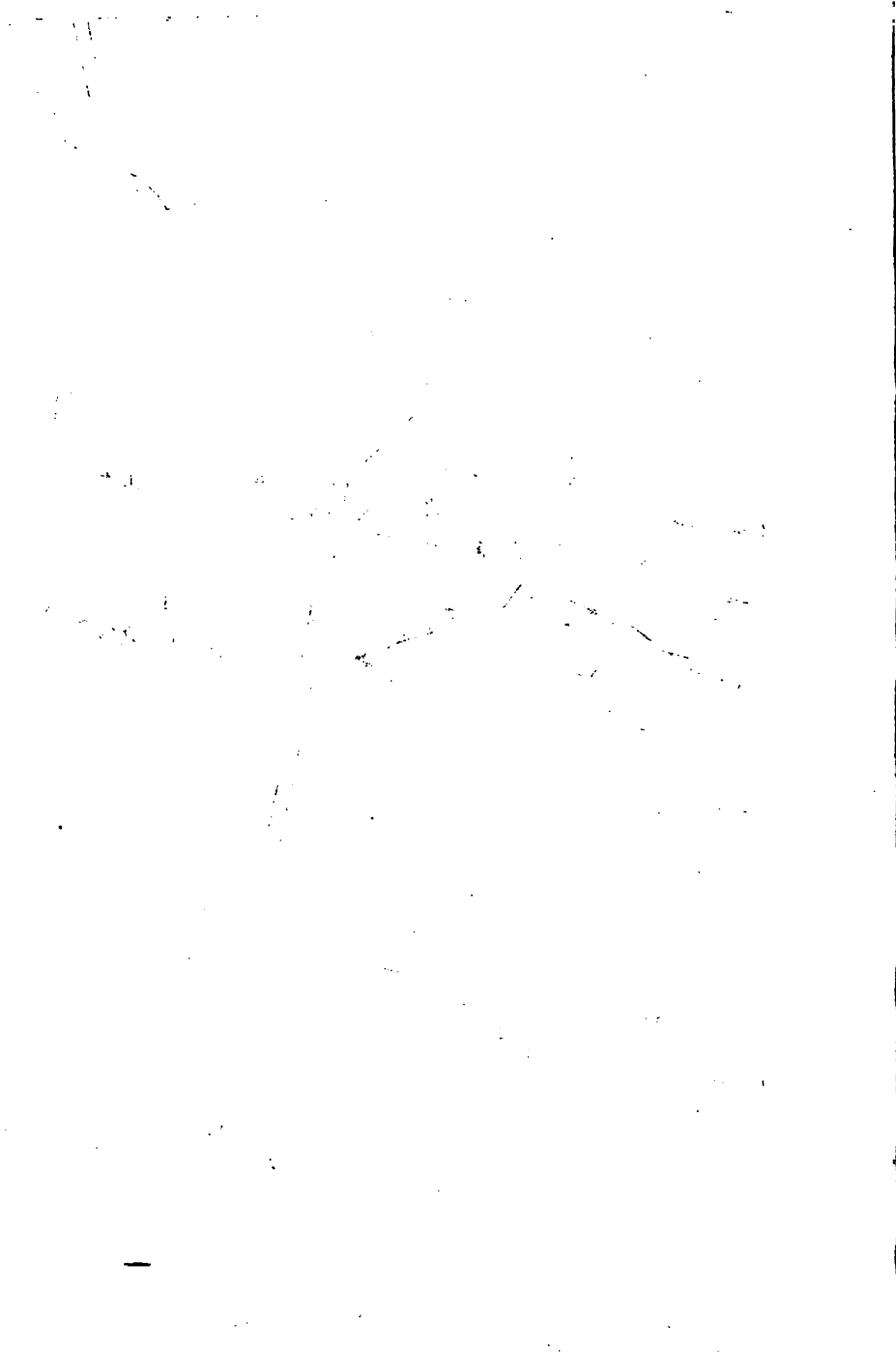
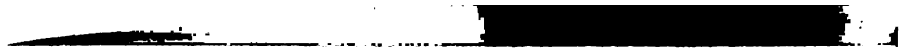
of New York and Boston, to whom direct application was made.

In addition to the information from the United States, referred to above, the Secretary of the Boston Transit Commission sent Reports of the Commission and the 29th Report of the Board of Railroad Commissioners for Massachusetts, which Reports contain a large amount of information respecting the work carried out for the purpose of improving the means of communication in the city. A full description is given in these Reports of the Subway used by the West-end Street Railway Company.

The General Managers of the following railway companies have been most obliging in furnishing me with statistics of their past and present traffic:—District, Great Eastern, Great Northern, Great Western, London Brighton and South Coast, London Chatham and Dover, London and North Western, London and South Western, London Tilbury and Southend, Metropolitan, Midland, North London, and South Eastern. The Labour Department of the Board of Trade, the Commissioner of Police, the Public Health Department of the City of London, the Statistical Department, and the Engineers' Department of the London County Council, have indicated sources of information and furnished me with extracts from their official records. The Secretary of the London General Omnibus Company gave me some interesting particulars as to the past and present working of the Company. The Thames Steamboat Company have answered some inquiries as to the river traffic.

To all the public bodies and companies above-mentioned, to Sir Horace Rumbold, Bart., G.C.M.G., Ambassador at Vienna, to Viscount Gough, First Secretary of H.M. Embassy at Berlin, to the Burgomaster of Brussels, to Mr. Austin Lee, C.B., of H.M. Embassy at Paris, and to many individuals my warm thanks are due for the material aid which they have so cordially afforded to me. As much more statistical matter has thus reached me than I could quote in the course of this address, I have added some of it in the appendix and have handed all the papers over to the Editor of the *Journal of the Society of Arts*, in order that the valuable information which they contain may be published in the *Journal* at a later date.





**STREETS AND TRAFFIC OF
LONDON.**



A P P E N D I X.

Appendix A.

The Statistics in this Appendix are compiled from the valuable information received through the Foreign-office, and from the Mayors of Washington, New York, and Boston, in answer to inquiries made as to certain particulars relating to the means of communication in foreign cities. Viscount Gough, First Secretary to H.M.'s Embassy at Berlin, sent information relating to that city; the Burgomaster of Brussels, through H.M.'s Minister, supplied statistics respecting Brussels; Mr. Austin Lee, C.B., gave the particulars of Paris traffic; and Sir Horace Rumbold, Bart., G.C.M.G., Ambassador at Vienna, supplied information respecting that city.

The information received may be classified under the following headings:—I. Daily Number of Persons entering or leaving the Cities. II. Particulars of Traffic. III. Number of Vehicles at Fixed Points. IV. Width of Streets.

Information as to Traffic of Foreign Cities.

I.—DAILY NUMBER OF PERSONS ENTERING OR LEAVING BERLIN, VIENNA, AND NEW YORK.

The average daily number of persons entering Berlin is stated to be about 150,000; but the daily ebb and flow of the population of the cities of Europe and of the United States do not appear to be available.

In 1896, 5,291,317 persons entered the city of Vienna by rail or an average of about 14,500 daily.

In New York the average number of passengers daily crossing New York and Brooklyn-bridge, during 1897, is given as 138,473. The average number of vehicles daily crossing is 4,500.

	Passengers.	Vehicles.
November 10, 1897 (24 hours).....	144,509	4,617
The highest number in one hour is from		
5 to 6 p.m., viz.	19,262	472
The lowest number, from 3 to 4 a.m., viz.	422	27

II.—MEANS OF TRAFFIC.

BERLIN.

The annual working expenses for the passenger traffic in Berlin are given as follows:—

Railways.	Tramways.	Omnibuses.
£150,000 to 200,000	£650,000 to £750,000 (including electric lines.)	£200,000 to £250,000

BRUSSELS.

In Brussels the number of different lines of Tramways and Railways, with the annual number of passengers, are as follows—

Tramways :—

Les Tramways Bruxellois, 16 lines (horse and 5 electric)—

Number of travellers	1896	30,760,989
	1897	39,304,795

Société Generale Chemins de fer économiques, 5 lines (horse)—

Number of travellers	1896	3,146,300
	1896	4,098,451

Société des Chemins de fer vicinaux, 1 line (horse)—

Number of travellers	1896	910,360
	1897	905,020

Société du Central Car, 1 line (horse)—

Number of travellers	1895	796,149
	1896	1,018,801
	1897	1,445,195

Société du Tram Car, 1 line (horse)—

Number of travellers	1896	2,658,493
	1897	2,806,330

Railways :—

Société de Chemins de fer à voie étroite, 5 lines (electric).

Société Nationale des Chemins de fer vicinaux, 8 lines (7 steam, 1 electric)—

Number of travellers	1895	1,687,737
	1896	2,110,830
	1897	2,303,881

PARIS.

In Paris the daily average of travellers from Paris to Auteuil and from Paris to Versailles is—

<i>Railways :—</i>	No. of Passengers.	Fares.
Paris—Auteuil, travellers going and returning	63,000	1st cl., 60c. ; 2nd cl., 30c.
Versailles, by circular railway ..	311,936	1f. 16c.

The annual movements by
tramcars and steamboats are :

<i>Tramways :—</i>		
St. Cloud and Sèvres	3,141,244	1st cl., 40c. ; 2nd cl., 20c.
Vincennes.....	7,739,350	„ „
North	29,887,943	„ „
South	27,160,032	„ „
<i>Boats :—</i>		
Paris to Suresnes	2,545,745	30c.

VIENNA.

In Vienna there are no electric railways. A metropolitan railway is in course of construction, and 21 miles 223 yards are open to the public.

Fares.			
1st class, $3\frac{1}{2}$ kreutzers ($\frac{1}{4}$ d.)	per kilometer.		
2nd „ $2\frac{1}{4}$ „ ($\frac{1}{4}$ d.)	„ „		
3rd „ $1\frac{1}{4}$ „ ($\frac{1}{4}$ d.)	„ „		

Tramways :—

There are $35\frac{1}{2}$ miles of tramway lines and 738 tramcars, of which 70 are driven by electricity. The Zone tariff is in force as follows :—

5 kreutzers (1d.)	paid for a ride from the 1st to the 2nd zone.				
7 „ ($1\frac{1}{4}$ d.)	„ „	„ „	3rd „		
10 „ (2d.)	„ „	„ „	4th „		
15 „ (3d.)	„ „	„ „	5th „		
20 „ (4d.)	„ „	„ „	6th „		
2 kreutzers charged from 2nd to 3rd ; 3 kreutzers from 3rd to 4th, &c.					

The Omnibuses number 520.

Fares :—7, 9, 12, 15 kreutzers, according to distance. The Zone tariff applies to omnibuses and to the metropolitan railway.

Hackney Carriages :—

Numbered, 972 with two horses.
 „ 1,514 „ one horse.
 Unnumbered, 1,298 „ one and two horses.

Fares.

Two-horse cab, 90 kreutzers (1s. 6d.) ; one-horse cab, 60 kreutzers (1s.) ; from one district to another.

From one point to any other in the same district, 60 kreutzers (1s.), two horse ; 40 kreutzers (8d.), one-horse.

For every quarter-of-an-hour beyond the ride, 40 kreutzers (8d.) are charged for two-horse, and 30 kreutzers (6d.) for one-horse.

The same extra charges are made for coming from or going to railway stations, or for setting down at theatres.

NEW YORK.

The chief means of communication in New York consists of elevated railways, surface railroads, and steam ferries.

Passengers carried on railroads for the year ending June 30, 1897 :—

For the territory now comprising New York

City 862,552,517

Fare 5 cents. for any distance. A passenger may make one continuous trip of 17 miles around the city on the Manhattan Elevated Railway for one fare of 5 cents.

WASHINGTON.

In Washington there are 180 miles of asphalte-paved streets, and the number of bicycles on these roads is given as 40,000.

Street railways (electric and cable) :—

The average daily number of passengers carried is 143,302.

The fare for one adult passenger in the cars, with privilege of transfer, is about 4½ cents. (2½d.).

The number of licensed public hack cabs and carriages in Washington is 441.

The following is a Table of the rates of fare for the public conveyance of passengers :—

ONE-HORSE VEHICLES.

BY THE TRIP.	DAY RATES.		MIDNIGHT RATES.	
	Between 5 a.m. and 12.30 a.m.	Each additional Five Squares or parts of Squares.	Between 12.30 a.m. and 5 a.m.	Each Additional Five Squares or parts of Squares.
EACH PASSENGER	Fifteen Squares or less.		Fifteen Squares or less.	
	25 cents.	10 cents.	40 cents.	15 cents.
BY THE HOUR.	FIRST HOUR.	Each Additional Quarter Hour or part thereof.	FIRST HOUR.	Each Additional Quarter Hour or part thereof.
	75 cents. \$1.00	20 cents. 25 cents.	\$1.00 \$1.25	25 cents. 35 cents.
ONE OR TWO PASSENGERS THREE OR FOUR PASSENGERS				

TWO-HORSE VEHICLES.

BY THE TRIP.	DAY RATES.		MIDNIGHT RATES.	
	Between 5 a.m. and 12.30 a.m.	Each Additional Five Squares or parts of Squares.	Between 12.30 a.m. and 5 a.m.	Each Additional Five Squares or parts of Squares.
ONE OR TWO PASSENGERS EACH ADDITIONAL PASSENGER	Fifteen Squares or less.		Fifteen Squares or less.	
	50 cents. 25 cents.	10 cents. 10 cents.	80 cents. 40 cents.	15 cents. 15 cents.
BY THE HOUR.	FIRST HOUR.	Each Additional Quarter Hour or part thereof.	FIRST HOUR.	Each Additional Quarter Hour or part thereof.
	\$1.50	25 cents.	\$1.50.	40 cents.
ONE OR MORE PASSENGERS.				

III.—NUMBER OF VEHICLES AT FIXED POINTS.

BERLIN.

The points of greatest traffic are as follows :—

	Daily, 6 a.m. to 10 p.m.	
	Foot pas.	Vehicles.
Potsdamer Platz (west district)	85,580	16,510
Brandenburger Thor (west district)	70,600	9,254
Unter den Linden (corner of Friederich Strasse) (west district)	120,800	13,246
König Strasse (corner of Spandauer Strasse) (central district)	92,300	12,978
Alexander Platz (central district)	151,220	11,915
Belle Alliance Brücke (south-west district)	112,751	10,240
Oranien Brücke (south district)	98,680	7,843

PARIS.

The average number of vehicles passing the Avenue de l'Opera during the 24 hours is 29,460, the vehicles being drawn by 36,185 horses.

WASHINGTON.

The number of vehicles passing the corner of Pennsylvania Avenue and Seventh-street (one of the most frequented points in the city) during the 24 hours from 12 o'clock noon, Nov. 5, to 12 o'clock noon, Nov. 6, 1898, was 9,726. The number of passengers in the vehicles was 16,848.

IV.—WIDTH OF STREETS.

BERLIN.

	Feet.
Unter den Linden (includes a broad walk with two rows of trees for nearly half of the whole length)	196
Leipziger Strasse	72
Friedrich Strasse	72
„ „ from the corner of Behren Strasse to Unter den Linden	41
König Strasse	57

The width of the pavements on both sides of the street is included.

BRUXELLES.

	Feet.
Le Boulevard Circulaire, between les Places de Namur and Louise	220
L'Avenue Louise	183
L'Avenue du Midi	118
Le Boulevard Auspadi	91

Le Boulevard du Nord.....	Feet. 78
Le Rue de la Nord	65
Le Rue Royale	65

PARIS.

Rue de Rivoli	88
Rue Montmartre	72
Avenue de l'Opera (Boulevard St. Germain)	98
Grands Boulevards	114
Avenue des Champs Elysées	229
„ de Grande Armée	295
„ Bois de Boulogne	393

VIENNA.

Ringstrasse.....	187
Kärntnerstrasse (Upper).....	62
„ (Lower).....	121
Praterstrasse	118
Rennweg	65
Hauptstrasse, 3rd district	65
„ 4th „	65
„ 5th „	72

NEW YORK.

The streets vary in width from about 60 feet to 150 feet.

The ordinary residence streets beginning at First-street and extending across the Island of Manhattan from east to west, up as far as 220th-street are 60 feet wide, excepting at intervals of about half a mile, when they are 100 feet.

The avenues which run north and west at right angles with the cross streets are 80 to 150 feet wide.

Below Houston-street or First-street, on Manhattan Island, the streets and thoroughfares are of irregular widths, following for the most parts lines of paths, lanes or roadways originally followed for convenience of the early colonists or settlers.

WASHINGTON.

Most of the Avenues named after the different States are 16 feet wide from building line to building line, with 50 to 107 feet roadway respectively.

Avenue.	Width.	Roadway.	Avenue.	Width.	Roadway.
Virginia.....	160ft. ..	50 ft.	New Jersey	160ft. ..	60 ft.
Maryland	160ft. ..	50 ft.	Pennsylvania ..	160ft. ..	107½ ft.
Delaware	160ft. ..	50 ft.	North Carolina..	160ft. ..	50 ft.

Appendix B.

TABLES OF POPULATION, NEW HOUSES, RATEABLE
VALUE, AND VEHICLES IN LONDON.

AREAS AND POPULATION.

Name of Area.	Acreage.	Population, 1891.
GREATER LONDON :—		
City and Metropolitan Police.	443,421	5,633,806
Administrative County (County and City of London)	75,442	(a) 4,232,118
West Ham District.	4,423	204,903

(a) Population of Administrative County for 1896 was 4,433,018.

POPULATION OF COUNTY OF LONDON, INCLUDING CITY & WEST HAM.

I.—POPULATION.

Year.	Administrative County (County of London, including City).	West Ham.	Totals of County, including City and West Ham.
1841	1,948,563	12,738	1,961,301
1851	2,363,274	18,817	2,382,091
1861	2,808,862	38,331	2,847,193
1871	3,266,987	62,919	3,329,906
1881	3,834,194	128,953	3,963,147
1891	4,232,118	204,903	4,437,021
1896	4,433,018	(a)	—

(a) No census of West Ham taken for this year.

II.—RATIO OF INCREASE OF POPULATION.

Year.	County of London, including City and West Ham.	
	Increase.	Increase per cent.
1851	420,790	21·45
1861	465,102	19·52
1871	482,713	16·95
1881	633,241	19·02
1891	473,874	11·96

**RATIO OF INCREASE OF POPULATION OF SUBURBS, OUTSIDE THE
COUNTY BUT WITHIN BOUNDARIES OF METROPOLITAN POLICE.**

Year.	Suburbs.		
	Population.	Increase.	Increase per Cent.
1841	286,781	—	—
1851	317,661	30,880	10·77
1861	413,858	96,197	30·28
1871	618,654	204,796	49·48
1881	932,467	313,813	50·73
1891	1,401,688	469,221	50·32

**RETURN OF NUMBER OF NEW HOUSES BUILT AND THE LENGTH IN
MILES AND YARDS OF THE NEW STREETS AND SQUARES FORMED
DURING THE UNDER-MENTIONED PERIODS.**

Period.	No of New Houses Built.	Length of New Streets and Squares.		No. of New Houses being Built Dec. 31, 1896.
		Miles.	Yards.	
From 1849 to 1854 ..	40,743	237	1,239	—
„ 1854 to 1864 ..	88,112	404	514	—
„ 1864 to 1874 ..	141,472	539	61	—
„ 1874 to 1884 ..	190,041	566	1,593	—
„ 1884 to 1894 ..	124,683	272	688	—
„ 1895 and 1896..	30,035	78	1,298	5,324
Totals....	615,086	2,099	113	5,320

**RATEABLE VALUE PER INHABITANT OF COUNTY OF LONDON
(EXCLUDING CITY).**

Year.	Population.	Rateable Value.	Rateable Value per head of Population.		
			£	s.	d.
1871	3,192,143	17,429,081	5	9	2·4
1881	3,783,625	24,149,813	6	7	7·9
1891	4,194,482	28,920,382	6	17	10·8
1896	4,401,935	31,342,240	7	2	4·8

**HACKNEY AND STAGE CARRIAGES—LICENSED BY METROPOLITAN
POLICE.**

Year.	Hackney Carriages.	Stage Carriages.	Totals.
1870	7,341	1,268	8,609
1885	11,000	2,000	13,000
1890	11,297	3,232	14,529
1895	10,961	3,813	14,774
1896	11,034	4,170	15,204
1897	*11,508	*4,568	16,076

* Eighteen of the four-wheeled hackney carriages and one omnibus are propelled by electricity.

Prior to 1870, public carriages were licensed by the Commissioners of Stamps. The records are stated to have been destroyed.

The Secretary of the London General Omnibus Company (Limited) has been so good as to supply the following statistics respecting the traffic by the omnibuses :—

In the year 1859, the total number of passengers carried by the Company's omnibuses was.....	38,899,247
Average fare paid per passenger	3·60d.
Total mileage run	12,064,511
Average number of omnibuses per day ..	568
In the year 1897, the total number of passengers	169,436,419
Average fare paid per passenger	1·48d.
Total mileage run	26,317,199
Maximum number of omnibuses per day..	1,160

The Company have now (October, 1898) 1,257 omnibuses running.

FARES IN 1866.

Kensington Church and Charing-cross	4d.
Sloane-street and Charing-cross ..	3d.
Charing-cross and Bank	3d.
Stoke Newington and Angel ..	4d.
Bethnal-green and Post Office..	4d.
Walbrook and London-bridge..	2d.
Old Ford and Bank	3d.
Hammersmith and Sloane-street	4d.
Hornsey-road and Angel	4d.

FARES IN 1898.

Kensington Church and Chancery-lane	3d.
Sloane-street and Chancery-lane ..	2d.
Charing-cross and Bank	1d.
Stoke Newington and Angel ..	2d.
Bethnal-green and Chancery-lane	2d.
Ludgate-circus and London-bridge	1d.
Old Ford and Bank	2d.
Hammersmith and Sloane-street	2d.
Hornsey-rise and Angel	2d.

As an illustration of the increase of cycles in the streets of the metropolis, it may be mentioned that in 1896 there were 1,299 accidents recorded by the police, of which only one was fatal. In 1890 there were 165; in 1880, 35; and in 1871 only 3. Previous to 1890 these accidents were entered as caused by velocipedes.

Appendix C.

REGENT STREET.

The most extensive improvement in Western London took place from 1813 to 1826 when the line from Portland-place to St. James's-park was planned and completed. An Act of Parliament was obtained in 1813 to sanction the formation of a new street intended as a means of communication between Carlton-house and Regent's-park.

Regent's-park, formed out of the old Marylebone-park, was laid out in 1812 from the plans of John Nash, architect. It was named after the Prince Regent (afterwards George IV.), who had the intention of building himself a residence at the north-east side of the park.

Portland-place was designed by the brothers Adam about 1778, and the great width of the road was due to a clause in Lord Foley's lease, which precluded the Duke of Portland from erecting any buildings to intercept the view from Foley-house, which stood on the site of the Langham Hotel.

The formation of Regent-street was largely due to the initiation of the Prince Regent, and it was carried out by John Nash, who was patronised by the prince.

Nash's original intention was to make his new street a continuation of Portland-place; and, in accordance with this intention, he bought Foley-house for £70,000, but subsequently he had to sell it, and then he formed the present turn in Langham-place. Regent-street, from Oxford-street to Glasshouse-street and Vigo-street, was built on the line of Swallow-street, but is of much greater width. The houses on the west side of Regent-street are built on the roadway of Swallow-street.

Swallow-street went straight down to Piccadilly, and this portion still exists. There is also a portion of the northern part between Princes-street and Oxford-street. The line of the new street being thus changed, Nash designed the Quadrant with bold projecting colonnades. These columns were taken away in 1848. St. Alban's-street was situated opposite Carlton-house and was removed in 1815 to make way for Waterloo-place and (Lower) Regent-street.

In 1826, Carlton-house was pulled down and the addition to Waterloo-place made. The United Service Club was built at this time, and the Athenæum in 1830. The York Column was erected 1830-33.

STREETS AND TRAFFIC OF LONDON.

PART II.

ADDRESS

ON THE

STREETS & TRAFFIC OF LONDON.

Delivered at the Opening Meeting of the Session (1899-1900) of the
SOCIETY OF ARTS, ON WEDNESDAY, NOVEMBER 18, 1899.
15

BY SIR JOHN WOLFE BARRY K.C.B., LL.D., F.R.S.
(CHAIRMAN OF COUNCIL.)

LONDON:
PRINTED BY WILLIAM TROUNCE, 10, GOUGH SQUARE, FLEET STREET, E.C.
1899.

ADDRESS

DELIVERED AT THE OPENING MEETING OF THE SESSION 1899-1900
OF THE SOCIETY OF ARTS, ON WEDNESDAY, NOVEMBER 15, 1899.

By SIR JOHN WOLFE BARRY, K.C.B., LL.D., F.R.S.

(CHAIRMAN OF COUNCIL.)

In my address delivered at the opening meeting of the last Session, I endeavoured to direct attention to the question of the inter-communication of the inhabitants of London by means of our streets and thoroughfares, and I ventured to state that it was a highly important and urgent matter.

I pointed out, firstly, that at the present time 6,000,000 of persons were directly interested in the subject, for, from suburban and Greater London streams of people are constantly passing in and out of the strictly urban portion of the metropolis, thronging the streets, many of which were made when the number of inhabitants was one-fifth or one-sixth of the present total. Secondly, that the daily influx of inhabitants from the outskirts of London to the central parts was, to a great extent, the creation of the last 30 or 40 years, and was owing partly to the development of suburban railways, and also greatly to the increased wealth of Londoners, which created a demand for travelling facilities, and enabled them to take advantage of those railways together with the tramways and other vehicular developments of all kinds, with which the capitalist class has so liberally supplied London and its environs during the past 40 years. The effect of these facilities for locomotion may be found in the fact that it seems no unreasonable estimate to suppose that 960,000 people enter and leave London daily by railways alone, and that the number of roadway vehicles has trebled in the last 27 years,

I gave many other statistics to which I need not now refer. They were interesting as showing the growth of traffic, and as an index of what may be expected in the future, but they were not necessary to bring home to the Londoner of to-day what is patent to everybody—viz, the fact that the traffic has overtaken the means for accommodating it, and that our main lines of arterial communication are intolerably overcrowded.

Since my address was delivered the police have taken the step of prohibiting empty cabs from moving about in search of fares. This may be necessary in the general interest, but it certainly deprives Londoners of a former considerable convenience, and it has necessitated the establishment in many of the main thoroughfares of cab ranks, which are in themselves most objectionable, in that they have the practical effect of seriously narrowing streets already too narrow for the moving traffic. When one sees rows of stationary empty cabs of great and hitherto unknown length occupying the middle of such streets as the Strand, Oxford-street, Queen Victoria-street, Pall-mall, Victoria-street, St. James's-street and Piccadilly, streets which are only of very modest widths, one cannot but recognise that the mere fact of these obstructions which have been allowed in lieu of "crawling cabs" is evidence itself of the fact that our streets cannot accommodate the traffic which desires to be moving in them.

I may point out, in this connection, that the width of a street is not to be judged of by merely considering the number of vehicles to be passed along it. It is valuable in a chief degree in order to permit of differences of speed. Thus, for instance, placing a cab rank in Queen Victoria-street, for almost the whole distance from the Mansion-house to Cannon-street, though it may still permit of four rows of moving vehicles, takes away a most important convenience by removing any facility for the inner rows of traffic adjusting their differences of speed, and, in fact, makes the street 12 per cent. narrower, and, probably, 25 per cent. less effective.

Such being the condition of things with a population of Greater London of 6,000,000, the question may well be asked, what will be the traffic thrown on our streets in the next 30 years, at which time it has been estimated by competent authorities that the population may be doubled and reach the enormous total of 12,000,000.

I pointed out the absolute and immediate necessity which we have to face, of providing our working-classes with thoroughfares by which they can reach their homes from their places of employment; and, lastly, I showed how the great development of travelling from all parts of the kingdom, whether the travellers were on business or pleasure bent, threw ever increasing streams of traffic on our overcrowded streets.

So far as any efforts have been made to grapple with the question, I indicated that, whether compared with what has been done in other capitals, or whether contrasted with the money which has been spent to bring traffic into London, the street improvements of the past 50 years were really extremely small. And I ventured to say:—

“When we come to consider more modern street improvements most of them seem piecemeal and patchwork enterprises, narrowed to the very least dimensions which would pass muster, and without any but the most meagre provision for the future, or the slightest attempt at systematic artistic treatment. In fact, we cannot but note a hitherto incurable *petitesse* in dealing with such matters in London, contrasting remarkably with what we see in foreign cities of smaller importance and of far less wealth than the English metropolis.”

The concluding part of my remarks were devoted to proposals, more or less precise, which I thought would do much to relieve the present congestion of traffic and make some provision for future demands. It is to those proposals and accompanying suggestions that I now desire to direct attention.

Whether my proposed streets and widenings were the right way to deal with admitted evils or not, I pleaded for a systematic consideration of the subject and the adoption of a comprehensive plan instead of the hand-to-mouth expedients which have been our custom, giving us new streets of inadequate width and irregularities of treatment which, in many cases, are almost ludicrous.

In the many notices and criticisms which were made of my remarks on the whole subject I do not think there was any denial of the facts which I had stated, nor was the necessity traversed for wider streets and other modes of accommodating traffic, &c.; but, as I had anticipated, I was dubbed “utopian” when I indicated some mode of curing the evils from which London is suffering, and the idea of spending the many millions which I admitted would be necessary in order to carry out my

suggestions was, in some quarters, indicated as an unwarrantable and extravagant demand on the ratepayers of London.

It seems almost unnecessary to admit that in such a city as London any radical cure for evils which have been allowed to accumulate must involve heavy expenditure. But I want now to point out how great the financial issues are on the other side and to endeavour to show that a large expenditure may be prudently undertaken in view of the results to be attained.

Within the necessary limits of my former address, it was impracticable to discuss, with any approach to detail, the financial aspect of the street improvements which I suggested, and even now I can only hope to do so in respect to some points of view. But it may be profitable to endeavour to deal in this way with some of the more important of my proposals. I intend, then, to discuss, first, the estimated cost of the new and widened streets which I suggested, and of the crossings of east and west and north and south traffic, by means of bridges over or under the streets, at six of the important places of intersection:—

1. Hyde-park-corner.
2. Piccadilly-circus.
3. Ludgate-circus.
4. Oxford-street and Tottenham-court-road.
5. Wellington-street and Strand.
6. Southwark-bridge and Upper Thames-street.

In approaching the figures of the estimated cost, I wish to lay stress upon two very important points.

First, that the net cost of such works is conditioned by the time given for the realisation of the properties forming the frontages of the new streets when made and of surplus property adjoining them.

Second, that the cost of the streets, however high, may be amply justified by the money saved to the public by improved means of locomotion.

To deal with the first of the above points it is obvious that if properties be bought at figures representing their extreme value at the time of sale, with an addition of 10 per cent. or more for compulsory sale, it is hopeless to resell them immediately except at great loss. Equally true, and indeed in a much aggravated form, is it recognisable that all moneys paid for trade compensation must be lost to the buyer unless time be given for trade to

resettle itself, so that a trading value may become part of the property to be resold.

These considerations affect in a most material way the resale of what is known under the generic term of surplus properties of such undertakings, which are the areas of land of which some portion is required for a new street, but of which very considerable portions remain as open sites fronting to the new thoroughfare and so available for sale, as well as other properties not actually required for making the new street, but which are evidently required to give a depth which would render the frontage more valuable.

In all these cases time is as in so many questions the essence of the matter, and it is now a privilege of the London County Council generally recognised by Parliament that for great street improvements a period of fifty or sixty years should be allowed within which the Council may hold the ground-rents of the surplus property before they shall be required to sell it.

How great a relief this is, was well shown by Mr. Shaw-Lefevre in an able article in the *Contemporary Review* last February. He gave an ideal case in which the surplus property produces ground-rents of £35,000 per annum, which, if sold at once, would realise 28 years purchase, or a capital sum of £1,000,000.

He shows, in the first place, that the Council can borrow at $2\frac{1}{2}$ per cent., which is equivalent to 40 years' purchase, and as it is a regulation of Parliament that any capital sum realised by selling ground-rents must be employed in cancelling the Council's $2\frac{1}{2}$ per cent. stock, which was employed in purchasing the property, there is an evident gain of 12 years' purchase, or about £400,000, in retaining the ground-rents. But more than this, as the period approaches (as of course it will approach at the end of 60 years) at which the building leases will expire, the value of the property covered with buildings will be far above the capitalised value of the ground-rent if sold within a few years of the building of the houses. How much this rise may be is a question of opinion, but Mr. Shaw-Lefevre, in his ideal case, puts the value at £4,000,000, as compared with the original £1,000,000 if sold at 28 years' purchase.

Mr. Shaw-Lefevre then deals with a concrete case—viz., that of the new street authorised between Holborn and the Strand, with all its accompanying improvements. He says that the

County Council's officers estimate the total cost at £4,862,000, and the immediate selling value of the new frontages and surplus land at £4,088,000, showing a net commercial loss of £774,000. He goes on to say that owing to the privilege of the Council holding the ground-rents for 60 years, there is every reason to hope that this great improvement will not cost the ratepayers one penny. If his ideal case is to be applied as an illustration of the concrete example, Mr. Shaw-Lefevre might have stated the case very much more favourably for the ratepayers.

Now, if these calculations are correct, or even approximately correct, it is clear that well-designed street improvements, when undertaken by a great municipality commanding the use of capital at $2\frac{1}{2}$ per cent., and with the right of holding the land on each side of the new streets, are not enterprises to be set aside because the first cost may be, as I stated last year, many millions.

The great thoroughfare, 125 feet wide from west to east of London, which I advocated, would, with subsidiary connections, be $5\frac{1}{2}$ miles in length, and though no doubt much of the property is very valuable, yet a large proportion of it is residential property, not of the very highest class, where no trade interests have to be bought. On the other hand, in some portions, especially at the eastern end, the first cost of purchase of the sites would be very high. On the whole, I should imagine, and I am fortified in this by the opinion of one of the first land valuers of London, that after making an allowance for the greater width, my new street would not compare, yard for yard, unfavourably with the proposed new street from Holborn to the Strand, which involves the compulsory purchase of four theatres, and the great building occupied by the offices of *The Morning Post*, the whole undertaking being four-fifths of a mile in length.

If this mode of estimate be permissible, we should see that the net cost of the new street from east to west through London, assuming that the ground-rents were sold at once, would be £5,750,000, and that if the ground-rents were retained for 60 years, the street could be made without any ultimate financial burden on the ratepayers.

This great new street was the principal item of expenditure in my suggestions, but it was by no means all. I have

endeavoured to form an idea of the cost of the other recommendations, and without wearying you with the details, I arrive at an additional outlay of about £1,420,000.

Assuredly, in view of the calculations of the Chairman of the Improvement Committee of the London County Council, in a similar case, there seems to be nothing so alarming in the cost of the improvements which I suggested, spread, as it would be, over a considerable number of years. It is easy to raise bogies when any proposal is brought forward for dealing with subjects in a comprehensive way, as contrasted with what I ventured to describe as the "piecemeal" mode of approaching such matters, which seems inherent in the British municipal mind.

I am bound in fairness, when quoting Mr. Shaw-Lefevre, to add that in the article to which I have alluded, he expresses doubts as to the expediency of a broad thoroughfare from east to west through London, first, on account of the cost, though he himself almost proves it to be perfectly within our means, and, secondly, because he doubts "whether it would relieve Oxford-street of a single omnibus."

As to whether it would relieve the traffic of existing thoroughfares, and make provision for the wants of the future, I venture to think this might be left to the judgment of the public, who seldom go wrong on such matters. It seems to me unreasonable to question its utility. If last July, when the Thames-embankment was under repair, Mr. Shaw-Lefevre had seen the block of vehicles in the Strand and Fleet-street, in which I myself was involved for nearly 40 minutes, he could not have doubted that the parallel roadway, 110 feet wide, of the Thames-embankment is daily and hourly of enormous benefit to Londoners, though in this case it is to be noted that the Thames-embankment does not ordinarily relieve the Strand and Fleet-street of any omnibuses. When, however, the traffic of the Embankment was all diverted to its old course the confusion was unparalleled in my recollection of London streets.

Again, those who have seen the effect of widening Parliament-street lately to a width of 125 feet have an object-lesson, and will not have much difficulty in realising what a boon such a street extending from Bayswater to Whitechapel would be to the traffic of London.

As to the service which the new thoroughfare would render,

there really cannot be any question, and thus the important matters are what would be the eventual not the first cost, and what is the money loss due to the present inconvenience of London streets.

Before, however, dealing with this latter question I wish to say a few more words as to the proposals which I ventured to put forward last year for crossing the north and south streams of traffic over or under the principal east and west streets, so as to avoid the serious delays and confusion at these places to which we are only too well accustomed. I suggested that this should be done at Hyde-park-corner, Piccadilly-circus, Ludgate-hill, the south end of Tottenham-court-road, Wellington-street, Strand, and Queen-street, City, by viaducts and bridges or by sunken roads as in each case might be more suitable. The relief to the main thoroughfares and the quickening of both streams of traffic by such improvements would be extremely important.

I went on to say that crossings, such as I indicated, would require much study as to their best and most economical lines and levels, and I could not within the limits of my address last year do more than state that I had satisfied myself that there is nothing impracticable in the suggestion, and that I felt confident that such improvements would be worth their cost, which, no doubt, would be considerable.

Since last year, I have looked more carefully into the circumstances of each case, and have laid down the lines of the works in question. These are shown in the diagrams, and I will briefly describe them.

I.—HYDE-PARK-CORNER.

In this case the west and east traffic would pass under the stream going north and south by means of a broad sunken road, leaving the Knightsbridge-road on the north side, and rejoining Piccadilly on the south side. A strip of land of an area of 3·1 acres would be required from Hyde-park and from the Green-park, and practically no buildings would be affected. It would consequently be a cheap undertaking.

II.—PICCADILLY-CIRCUS.

This is a much more difficult and a highly expensive work. The north and south traffic would cross under the west and east

traffic by means of a central sunken road descending from the north end of the Regent-street quadrant opposite Vigo-street, passing under Piccadilly-circus, and emerging in the Hay-market, the portion under Piccadilly-circus and Coventry-street being in tunnel for a length of some 150 yards, with openings for light and air.

III.—LUDGATE-HILL.

In this case the north and south traffic would be crossed over the east and west stream by means of a low viaduct and bridge. The natural way of dealing with this crossing would be to cross the east and west lines over the north and south, as the gradients of Fleet-street and Ludgate-hill lend themselves to that arrangement. But the railway bridge across Ludgate-hill necessitates the other plan of crossing, unless a very formidable work somewhat like the Holborn-viaduct were undertaken, which, apart from cost, would no doubt be a better mode of dealing with the traffic, and would have the great advantage of avoiding the inclines of Ludgate-hill and Fleet-street. Setting this aside for the moment as too expensive, and dealing with the more modest scheme of crossing the north and south traffic over Fleet-street, the proposed viaduct would leave New Bridge-street on the west side and rejoin Farringdon-street on its west side. It would involve interference with a certain amount of valuable property, but the existing frontages would be to a great extent preserved, and, of course, new frontages would be created. I have shown the alternative of a high viaduct running east and west on the sketches, and every one can see that apart from cost it is the better scheme.

IV.—OXFORD-STREET AND THE SOUTH END OF TOTTENHAM-COURT-ROAD.

At this place the west and east traffic would cross over Tottenham-court-road on the north side of Oxford-street. The properties are not extremely valuable, as it would be possible to avoid the Oxford Music-hall and other important buildings fronting Oxford-street by keeping the new high-level road about 150 feet to the north. The gradients might involve the raising of the level of Oxford-street opposite Rathbone-place some two or three feet, otherwise no considerable difficulties would be encountered.

V.—WELLINGTON-STREET, STRAND.

In this case the crossing ought to form part of the present scheme of the London County Council for their new street to Holborn, if it is to be a really successful work. The gradient of Wellington-street clearly indicates that the north and south traffic should cross over the Strand. With the exception of the Lyceum Theatre the property is not specially valuable. The County Council do not think much of the value of theatres for they are going to acquire, as previously stated, four in connection with the Holborn and Strand improvement. The crossing street would ascend from the corner of Tavistock-street and Wellington-street by easy gradients, keeping to the west side of the latter street and descend by a grade of 1 in 30 to rejoin Wellington-street at the north end of Waterloo-bridge.

VI.—THE PASSING OF THE NORTH APPROACH OF SOUTHWARK-BRIDGE OVER UPPER THAMES-STREET.

This is a work which speaks for itself and presents no serious difficulties. The crossing street would continue the level of the north end of Southwark-bridge and would be parallel to and to the east of Queen-street, descending to rejoin the existing level at the corner of Cannon-street and Queen-street.

Having, then, laid the foundation by estimating—in the way which I have mentioned—the cost of the improvements on the north side of the Thames, which I suggested for consideration, I now reach the second of the main questions to which I alluded above, viz., which is the money which would be annually saved to the inhabitants of London by improved means of communication.

Now it is obvious that the adequacy of the streets of a town for its trade and commerce must be a question of proportion, and I think it will be generally admitted that London has fallen behindhand in this respect. But it is difficult to put the deficiencies of our metropolis into pounds, shillings, and pence. I propose, however, to make some attempt to do so, though I am free to confess that any mode of estimating must be open to criticism, because we are dealing, to a great extent, with calculations of value on which opinions may widely differ.

It may be remembered that last year I quoted two estimates made many years ago of specific instances where traffic was impeded and delayed.

The first was an estimate by Colonel Haywood, in the year 1867, of the loss annually due to the delays caused by the Holborn-hill and its right-angled crossing. This estimate amounted to £100,000, and took account only of the loss to those owning vehicles and horses, and omitted the loss sustained by passengers in the vehicles and by foot-passengers.

There can be little doubt that the loss at the Ludgate-hill, Wellington-street (Strand), and Piccadilly level crossings must in 1899 be in each case at least as much as at Holborn-hill in 1867. We may perhaps put the other three crossings of my list as equal to one Holborn-hill crossing, and if these figures are correct, we arrive at the startling figure of £400,000 per annum for the six crossings in question.

The second estimate, made over 30 years ago, was that a loss of from £400,000 to £500,000 a year was sustained by Londoners in the difficulties under which the coal trade alone lay in consequence of restrictions under which it was necessary to place it.

The loss due to Holborn-hill has been stopped by the construction by the City of the admirable Holborn-viaduct and its accompanying streets. But the loss on trade remains practically untouched, and has no doubt grown to far larger proportions during the years which have elapsed since the estimate was made.

Now we know that the coal trade, large as it is, forms only a part of the carted trade of London. The coal trade is but a small per-centage of the whole goods and merchandise brought into London; most of us are acquainted, for example, with the restrictions placed on the carting of building materials or the removal of the results of excavations.

If the estimate of the coal trade should now be taken as £450,000 a year, it seems to me that it might be safely doubled to include other trades, and we so reach a sum of £900,000.

I will now refer to certain statistics which I have obtained as to delays to all descriptions of traffic. They are based, in the first instance, on the enumerations of vehicles made by me last year in three of the principal thoroughfares, enumerations not taken at a busy time of the year when London is full, but in the month of October. I feel sure that if May or June had been chosen the figures would have been much higher.

However, subject to this qualification, I found that in one

hour the following numbers of vehicles and pedestrians passed a given spot:—

	Vehicles.	Pedestrians.
Cheapside	992	6,358
The Strand	1,228	5,660
Piccadilly	1,497	3,910
Tottenham-court-road	661	5,586

It is to vehicles and pedestrians in such numbers that obstructions occur, and I want, if possible, to arrive at some idea of the amount of delay, and of the consequent unnecessary expense to which such volumes of traffic are now subjected by want of adequate streets.

By another enumeration I found that in an hour the following number of omnibuses included in the above figures, pass a given spot:—

Cheapside	384
The Strand	444
Piccadilly	423
Tottenham-court road and Oxford-street junction ..	487

I think we may thus assume that, on the four routes in question, we have to deal with an hourly traffic during the working part of the day, of 1,750 omnibuses, 1,500 cabs and carriages, and 1,000 carts.

There is, of course, much difference between different parts of the day in respect of the over-crowding of traffic and the amount of delay which it occasions. I do not think we should be far wrong in taking an average of 9 hours per day (say from 9.45 a.m. to 6.45 p.m.) as the period during which three of the routes mentioned are overcrowded, and in the case of Piccadilly, a period of 11 hours, recognising that the amount of overcrowding is by no means uniform during the hours in question.

Thus we arrive at the fact that on these four routes only each day 16,650 omnibuses, 14,900 cabs and carriages, and 9,700 carts and other vehicles find their course impeded and delayed by the crowded state of the streets.

The absolute amount of retardation is a matter of estimate from observation, and presents some difficulty.

I have had the time taken of vehicles in crowded and less thronged and free parts of the main thoroughfares, and I find that the amount of retardation in different parts of the four main streets alluded to, varies from 10 per cent. to 44.8 per cent., as compared with the speed in unimpeded parts of the street.

As an example I find by observations that the speed of a hansom cab from Liverpool-street to Victoria, with a remarkably good horse, on a by no means exceptionally crowded day, varied along the route from a speed of 4 miles an hour to a speed of 10 miles an hour on the Thames-embankment and 9 miles an hour in Whitehall.

A series of observations as to the speed of omnibus traffic in impeded and unimpeded streets also corroborates this view.

From these considerations I think that I am underestimating the retardations due to overcrowding at 20 per cent. on the four routes in question, which is equivalent to saying that one allows four minutes additional on a journey which, if the streets were as wide as Whitehall, would occupy 20 minutes.

I am anxious not to overstate the case, and I know in my own practice that I allow far more than such a per-centage when I have to keep an appointment or catch a train.

For instance, I often have to drive from Westminster to Broad-street and I find that at least 25 minutes must be allowed, and the distance, which is $2\frac{1}{2}$ miles, should be covered easily in 18 minutes.

But taking, for calculation, 20 per cent., to what does it amount in money for the loss of the time of the vehicles and passengers? The value of the time of the vehicles and driver can be pretty nearly arrived at, and I assume in this respect 4s. per hour for an omnibus, 2s. 6d. per hour for a cab, and 2s. per hour for a cart. We then have the passengers, and I take 10 passengers in each omnibus at 9d. per hour, $1\frac{1}{2}$ passengers per cab, and private carriage at 3s. per hour. Of course, difference of opinion may arise as to these rates of value for the time of passengers, but when we remember the large number of professional men, and of the mercantile classes who are delayed in cabs and carriages, 3s. per hour seems a moderate figure for that class of vehicle, and will allow for those, male or female, whose time is of little value. Similarly, when a working man's time is valued at 1s. per hour, my estimate for the omnibus passengers does not seem high after making allowances as before.

It would be wearisome if I went into all the details of the examination which I have given to the subject, but applying these figures to the volume of traffic in the four streets in question, it would appear that the hourly traffic in these streets involves £1,631 per hour. If this is delayed 20 per cent., it means a loss,

in respect of vehicular traffic only, of £880,740 per annum. There remains to be added the traffic of the Euston-road and Queen Victoria-street if we are to include the chief east and west routes, and perhaps these may be taken at about 15 per cent. of the above figures. We have also to include the traffic which crosses these four chief routes, and is there greatly delayed, and this, I think, may be taken at about 20 per cent. of the above figures of the east and west streams.

In addition to vehicular traffic we have pedestrian traffic to consider. Applying the same mode of calculation as above, and from observations taken, I come to the conclusion that this traffic (21,514 individuals in all, per hour, in the four streets under consideration) is delayed to the extent of one-third of the delays to vehicular traffic or, say 6·6 per cent., and if we assume a value per hour of 4d. per individual, allowing for females and non wage-earning persons, we arrive at an annual loss of £65,000.

To sum up, therefore, I arrive at an annual loss on the various routes above discussed of—

Trade interests	£900,000
Vehicular traffic.....	1,189,000
Pedestrian traffic	65,000
	£2,154,000

I do not pretend that these figures can be more than an attempt to put before you in money the daily and hourly inconvenience which Londoners sustain by narrow over-crowded streets, and I should not have attempted to estimate the money value except for the purpose of trying to see something of the relation between capital and revenue.

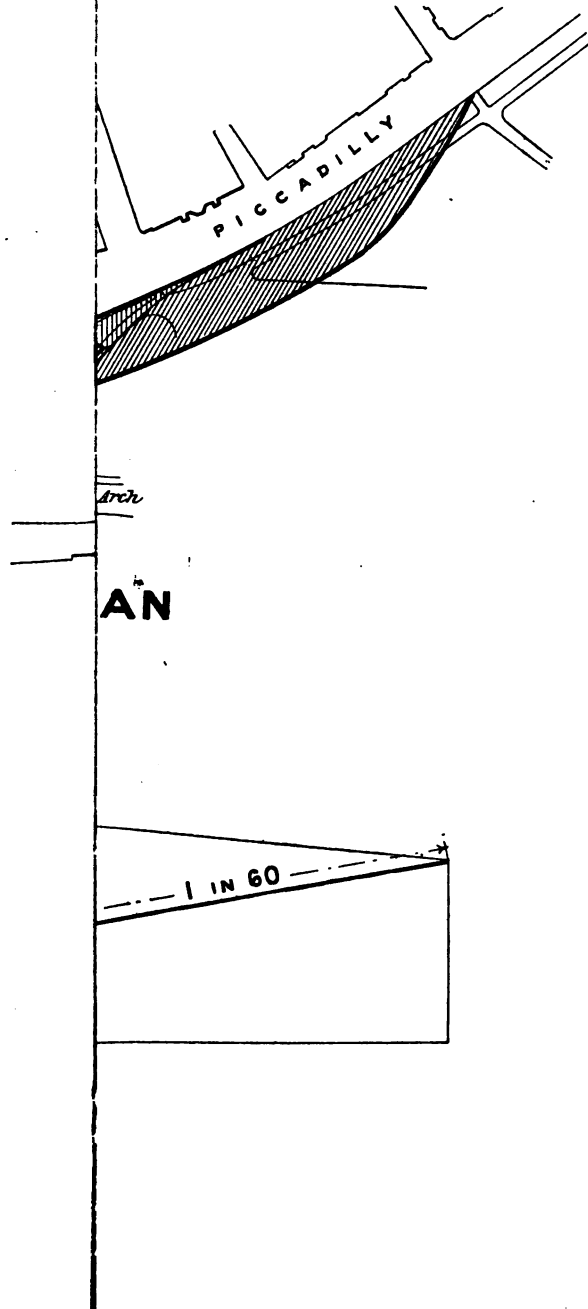
That a very large amount of money is being wasted will not be denied, nor can it be doubted that whatever the loss may be it is getting worse and worse every year. But neglecting this consideration, and capitalising the present loss, whatever its true figures are, at 30 years' purchase, we can see that many more millions of expenditure in improving the facilities for traffic on the north side of the Thames than I have estimated would be commercially justifiable.

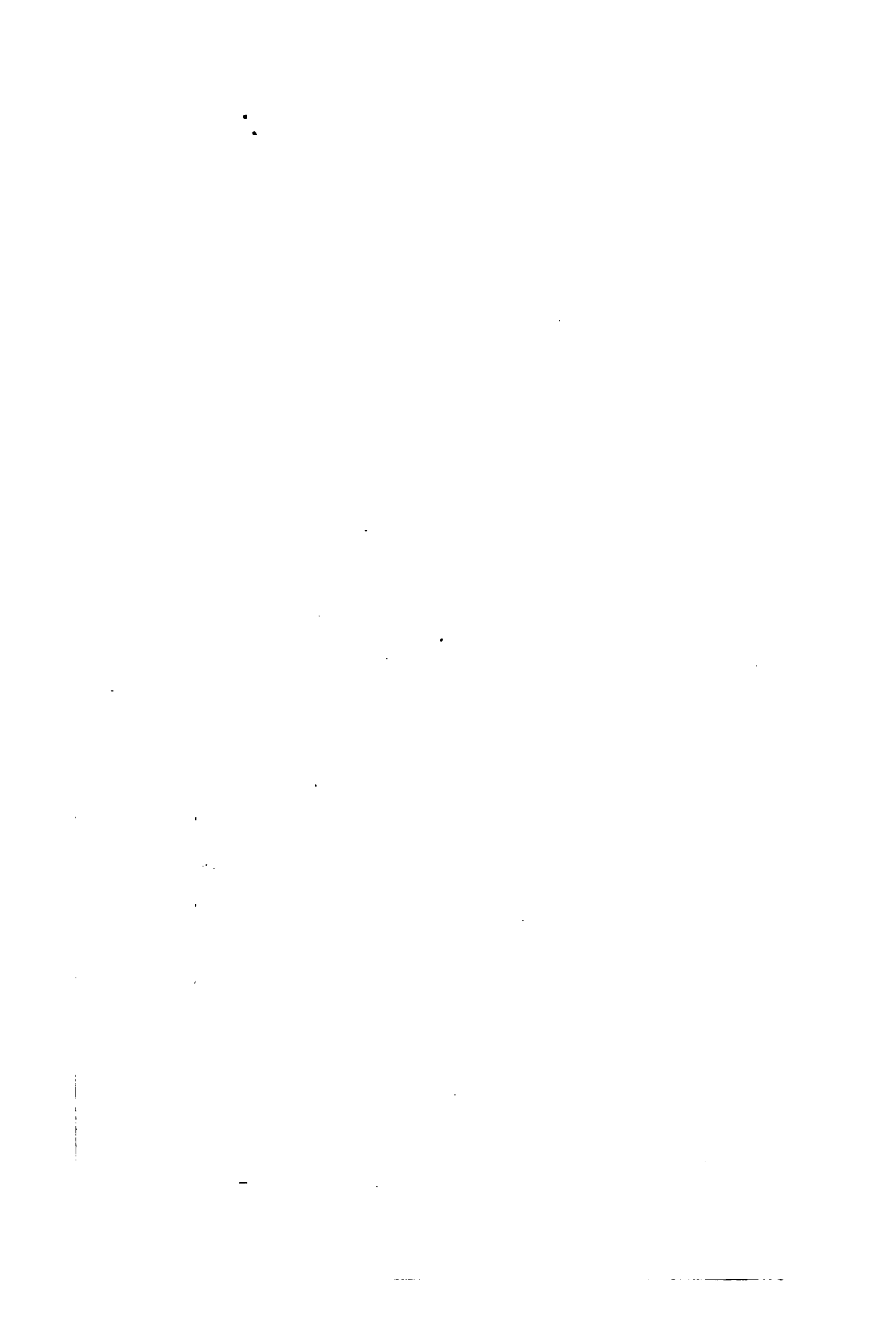
I feel sure that this is taking a low view of the financial aspect, for impediments to trade and commerce cannot be appraised by merely taking the value of vehicles, horses and drivers, and the wages or salaries of passengers.

Again, it leaves out of account all other matters referred to in my address of last year, such as the impossibility of tramways and the dangers to bicycle traffic, the safety of travellers, all æsthetic considerations and influence on pleasure traffic which our continental neighbours, at least, value highly, and for which they make streets and boulevards, which utterly shame the meanness of London thoroughfares.

Again, then, I enter my plea for a systematic consideration of this great subject as compared with hand-to-mouth attempts to cure isolated evils when they become too intolerable. Let us not fold our hands or allow our representatives to persuade us that all is for the best in London. We want a large-minded plan for dealing with admitted evils, a plan to be worked to gradually, and one which, when realised, will really accommodate our present and future traffic, and be a credit to the metropolis of Greater Britain.

Plate I.





Pico

HORIZONTAL SCALE

II.

200 YARDS

WATERLOO PLACE

N

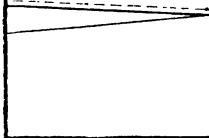
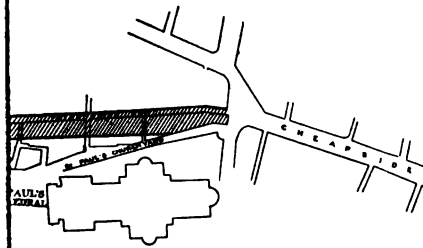
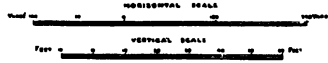
sent Road

FEET 10

LEVEL

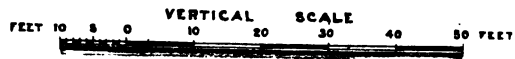
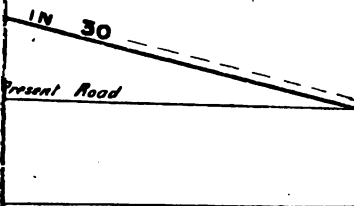
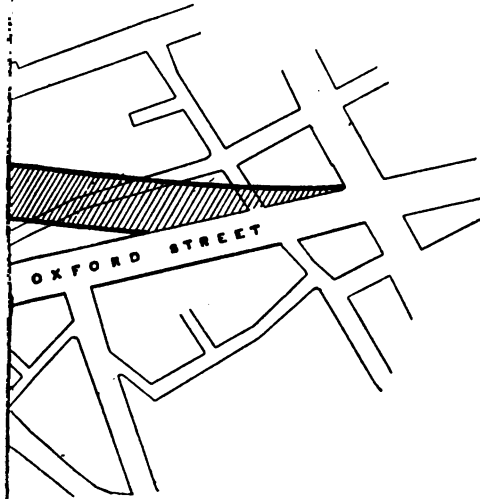
III.

LUDGATE CIRCUS



IV.

ATTENHAM COURT ROAD



V.



STREET STRAND

SCALE

100

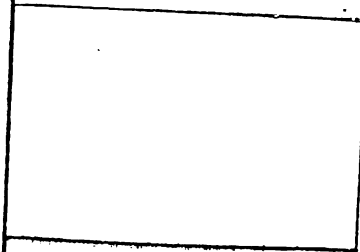
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SCALE

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40

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VI.

THWARK BRIDGE

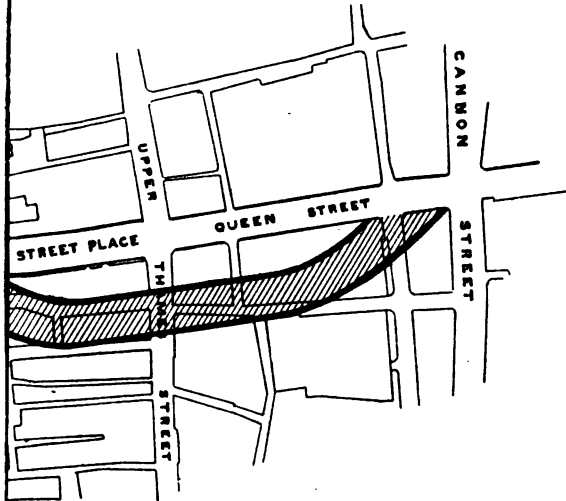
HORIZONTAL SCALE

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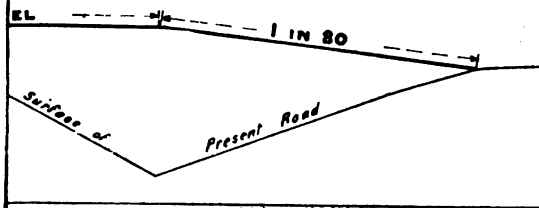
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VERTICAL SCALE

0 10 20 30 40 50 FEET



PLAN



SECTION